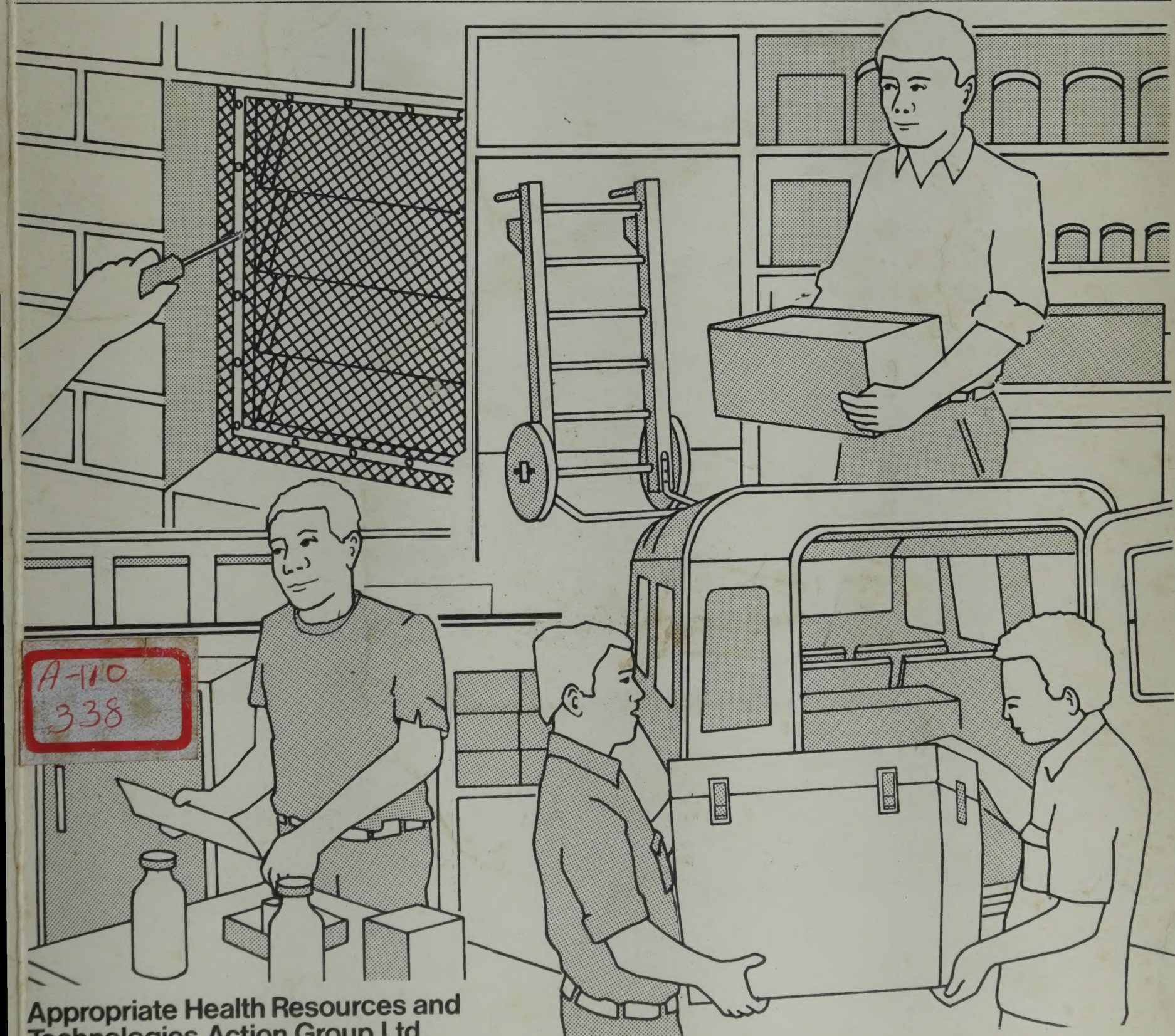


# How to look after a health centre store

Building / Layout / Equipment / Managing Supplies

Anthony Battersby



Appropriate Health Resources and  
Technologies Action Group Ltd.





# **How to look after a health centre store**

**COMMUNITY HEALTH CELL**

47/1 St. Mark's Road, Telok Ayer Steng, Singapore 560 001

338

A-110

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47/1, (First Floor) St Marks Road,  
Reading

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# Foreword

Proper management of health centre stores is a vital component in the effective organization and operation of supply chains for primary health care programmes. This book is especially welcome at a time when it is crucial to increase efficiency of use of available health resources. One of the main problems faced by health centres is how to maintain a steady and reliable supply of essential drugs – including vaccines and oral rehydration salts. Expanded immunization and diarrhoeal disease control programmes, including widespread application of oral rehydration therapy, offer promising and relatively low cost ways of achieving rapid improvements in health and reduction of infant and child mortality.

This book provides basic guidelines for simplified, but sound, approaches to the running of a health centre's medical store. How to store essential drugs and other basic supplies properly, how to arrange for re-ordering of supplies and how to organize storekeeping to make the most efficient use possible of the available supplies.

UNICEF is pleased to be associated with AHRTAG in producing this practical reference book. *How to look after a refrigerator* has already proved very useful. *How to look after a health centre store* is a valuable addition to this type of much needed literature.

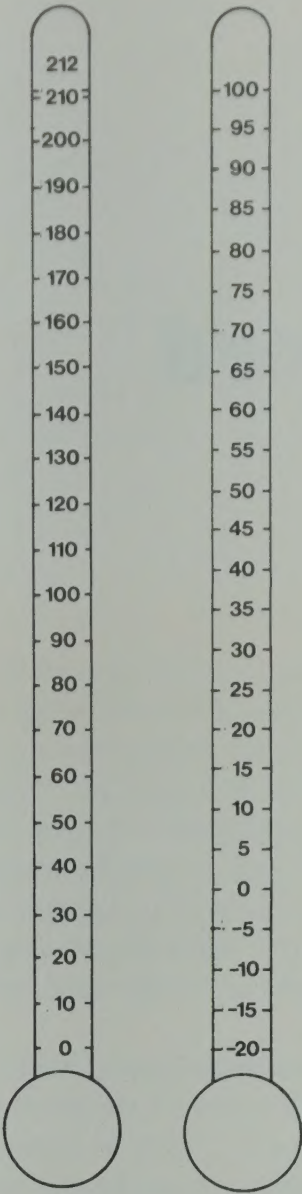
**James Grant**  
**Executive Director**  
**UNICEF**

# Metric – Imperial conversion

## Temperature

*Fahrenheit (°F)*

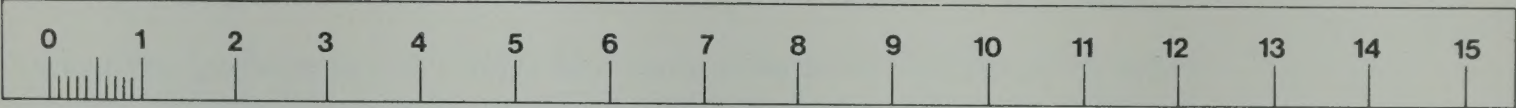
*Centigrade (°C)*



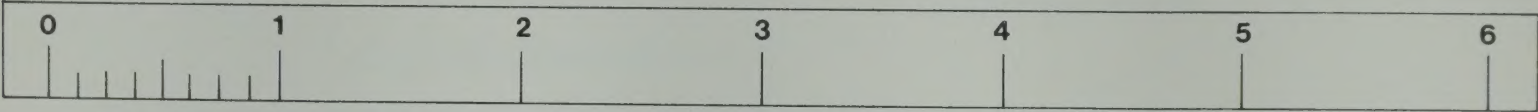
$$^{\circ}C \times 2 - 10\% + 32 = ^{\circ}F$$

## Length

*Centimetres*

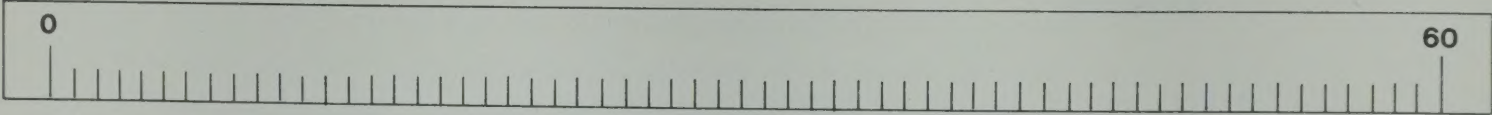


*Inches*

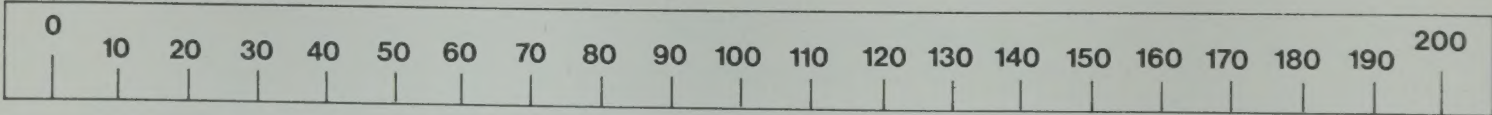


*Metres*

$$Cms \div 2.5 = Inches$$



*Feet*



*Length*     $Metres \div 3 \times 10 = Feet$

*Area*     $M^2 \times 11 = Ft^2$

*Volume*     $Litres \times 2 - 10\% = Pints$

$Litres \div 30 = Ft^3$



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# Section 1

## Where to locate the store

**This section helps you to decide:**

- the size of the store
- where to locate it
- how to prepare it

### The size of the store

This depends on how often you receive supplies and the quantities you have to store. Supply intervals at a health centre are probably about one month to six months.

**In your store keep:**

- drugs (you need to keep vaccines and sera, blood and some injectables in a refrigerator)
- contraceptives
- food
- dressings
- laboratory chemicals
- other consumable items, such as record cards, cleaning materials, insecticide, kerosene, torch batteries, syringe needles, plastic tubing and spatulae, disinfectants and antiseptics.
- some equipment such as wheelchairs, stretchers, splints and sterilizers.
- and finally you need space for a desk and chair.

The following helps you decide how much space you need:

*Figure 1*

Number of people which your clinic serves	Supply intervals	Area of store
10,000	2 months	10m <sup>2</sup> *
10,000	4 months	20m <sup>2</sup>
20,000	2 months	20m <sup>2</sup>
20,000	4 months	40m <sup>2</sup>
40,000	2 months	40m <sup>2</sup>
40,000	4 months	80m <sup>2</sup>
80,000	2 months	80m <sup>2</sup>
80,000	4 months	100m <sup>2</sup>

\* Throughout this book metric dimensions and sizes are used. If you use imperial dimensions and sizes, a conversion chart is shown before the contents section.

## Where to locate the store

If your store is inside an existing building use an internal room on the ground floor which is near the front door. This gives the greatest security and, with good ventilation, is the coolest position.

If the store is upstairs, make sure the floor is strong enough. To do this measure the wooden beams which are under the floor boards. They should not be less than 15 x 5 cms. If the floor is concrete, it should be strong enough.

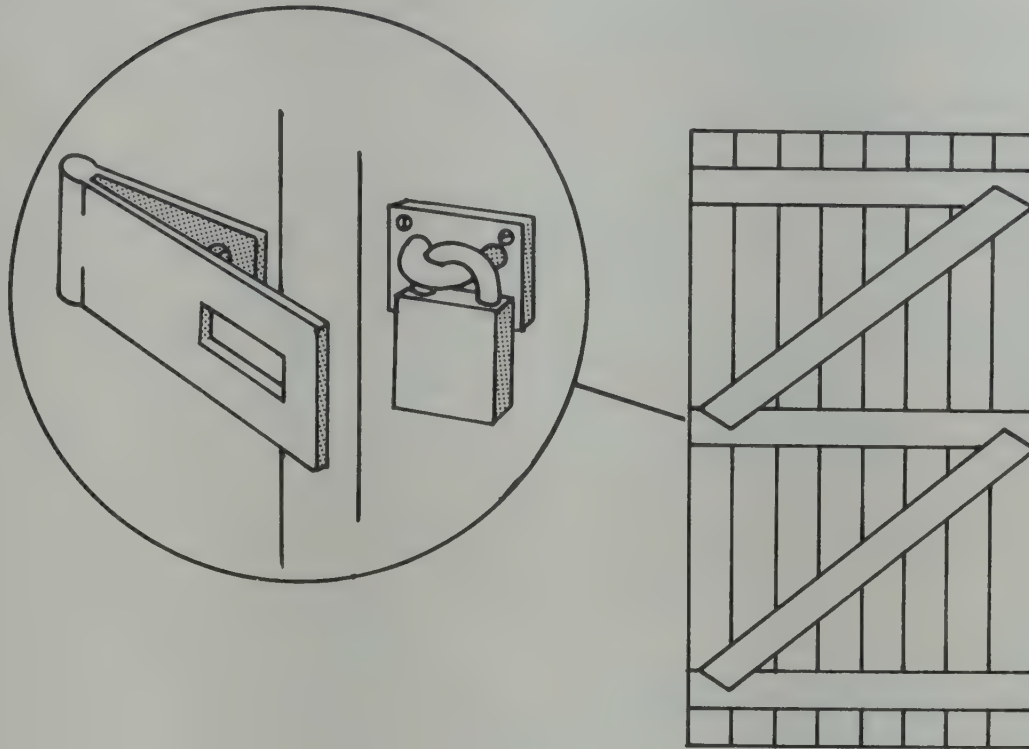
If the store is in a separate building, make sure that it is shaded, easy to get to, and near other buildings. Keep it away from the kitchen and sterilizing area.



# How to prepare the store

**Security** First of all your store must be secure. This is particularly important for doors and windows. Simple ways to do this are shown below.

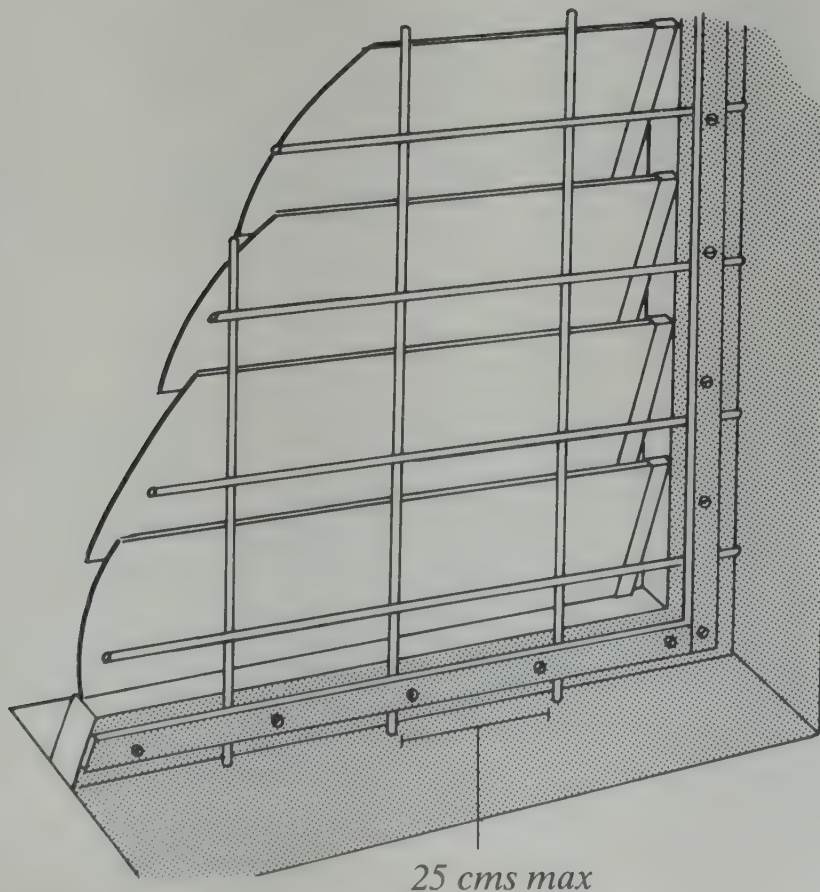
## Doors:



The ledged and braced door shown above is cheap, strong and easily made.

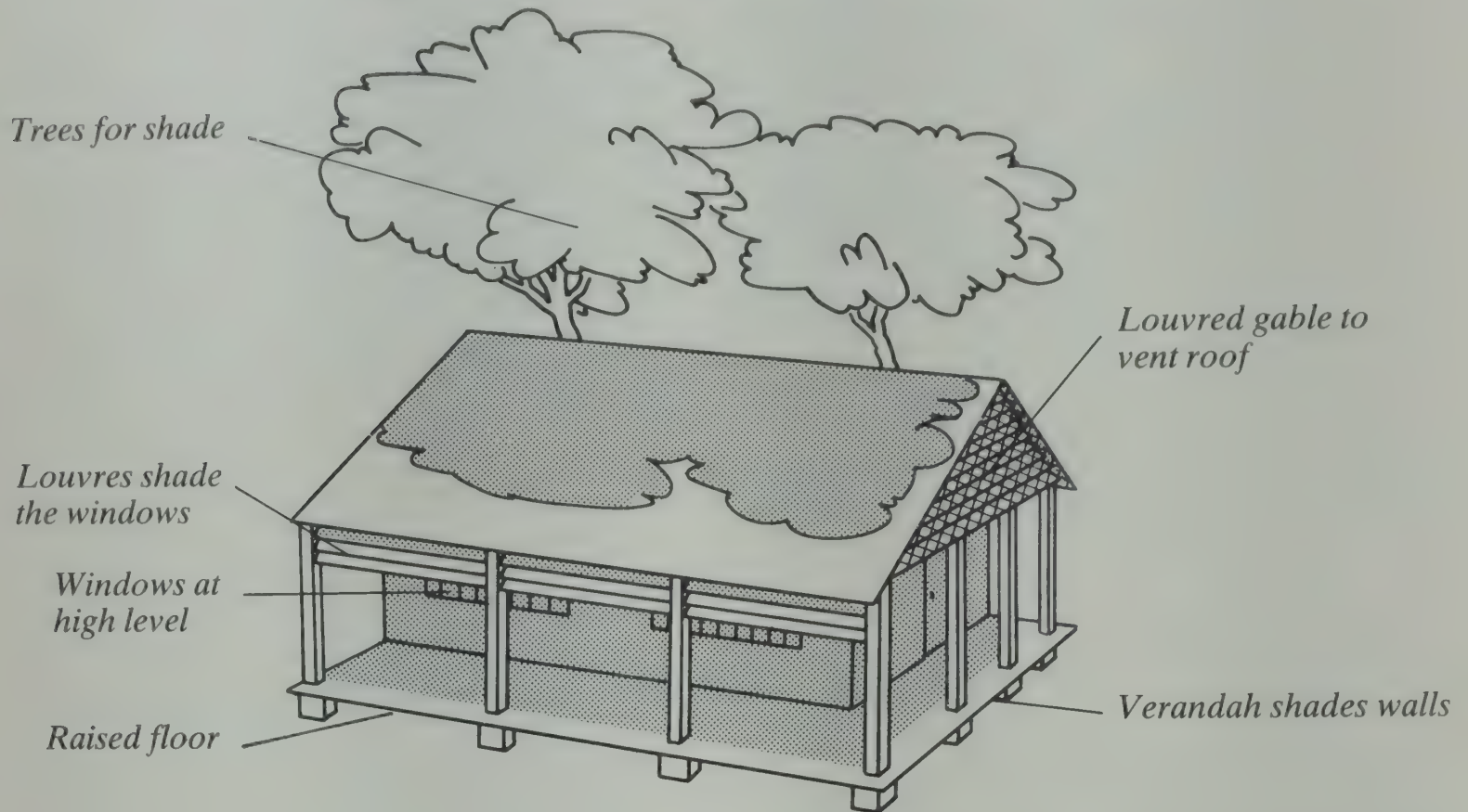
## Windows:

Windows should be at a high level so that the shelves do not block them. Use glass which you cannot see through or curtains or blinds to shade the store from sun. Cover all windows with weld mesh or metal bars and mosquito mesh.

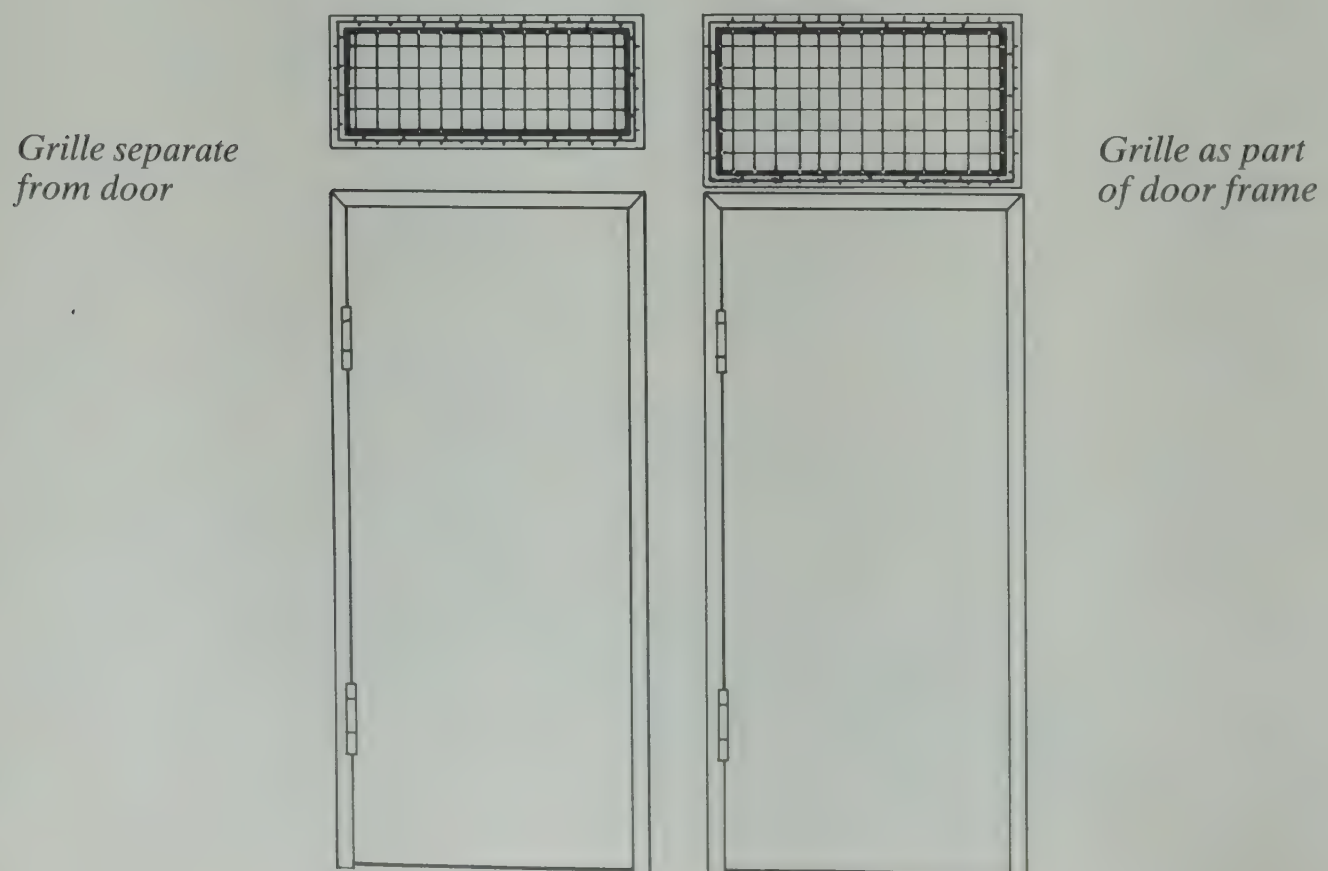


**Cooling** If the store gets hot, the heat may spoil many items. There are two ways to keep it cool.

1. Stop the heat from the sun getting in. To do this keep the room shaded and insulated. The simplest form of roof insulation is thatch. But you can also use fibre board roof lining.
2. Get rid of the heat by ventilation. The picture below shows a well shaded and ventilated building.



If the store is a part of an existing building, make sure that there is good cross ventilation. If there is only one outside wall make a grille, like the ones shown below, in the opposite wall.

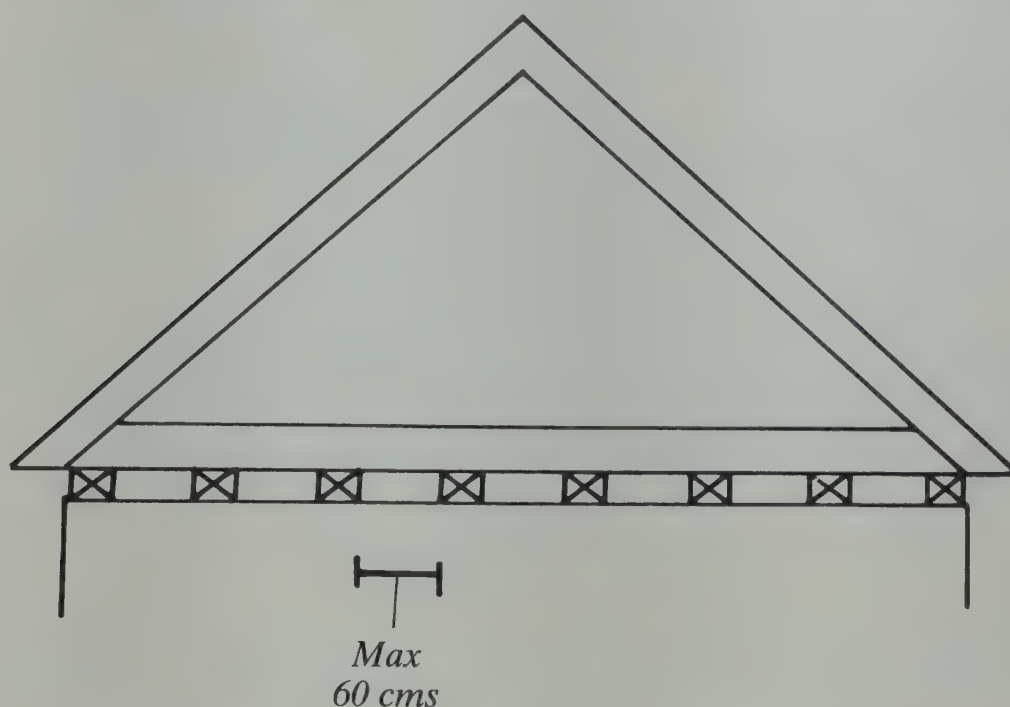




**Finishes** It is easier to keep the store clean if all walls, the floor and the ceiling are smooth.

### Ceiling:

If there is no ceiling make one of hardboard on beams like this:



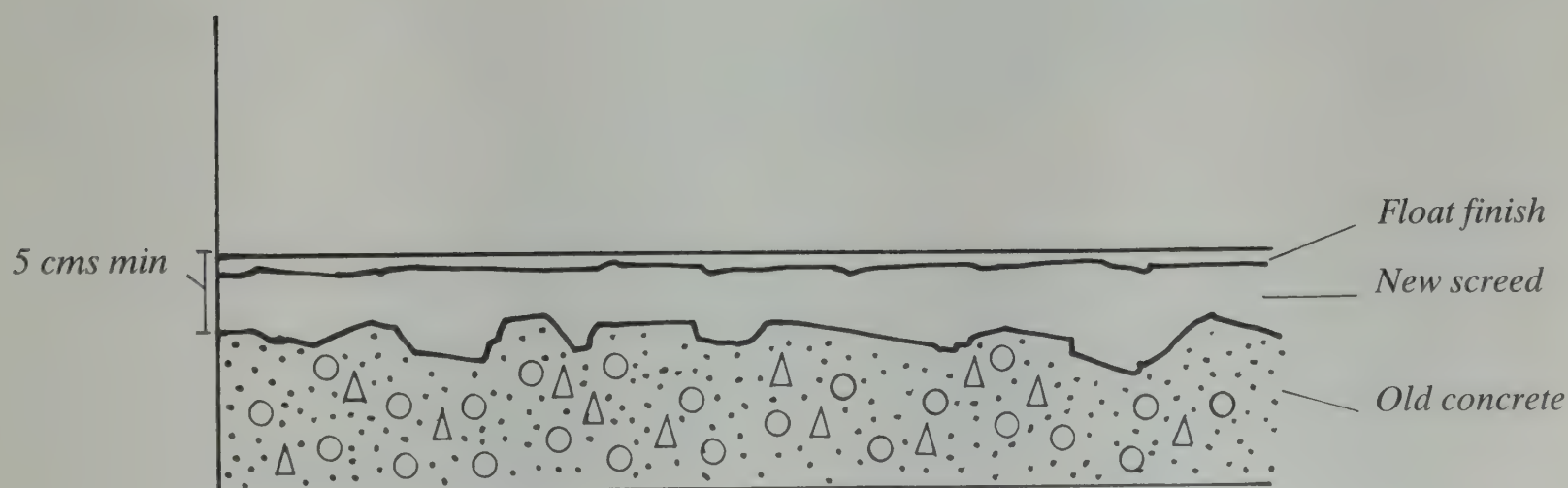
If the beams are more than 60 cms apart, the hardboard sinks in the middle.

### Walls:

Walls should be smooth. Paint them with washable paint.

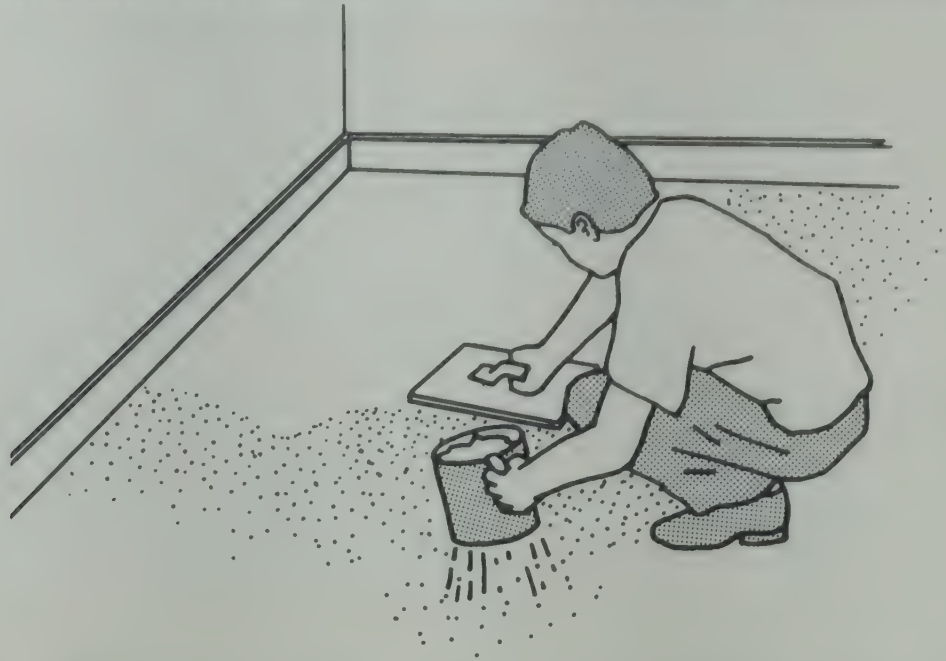
### Floors:

Floors should be smooth. If the floor is concrete and damaged, repair it by laying a layer of cement and sand. For this mix one part cement to four parts of sharp sand. Even if the floor seems in good condition give it a thin layer of cement. Remember termites can get through the smallest crack.



Smooth this layer and sprinkle it with cement. Use a tin with holes in the bottom to sprinkle the cement.

Trowel off the final coat. This makes a smooth, hard surface when it is dry.



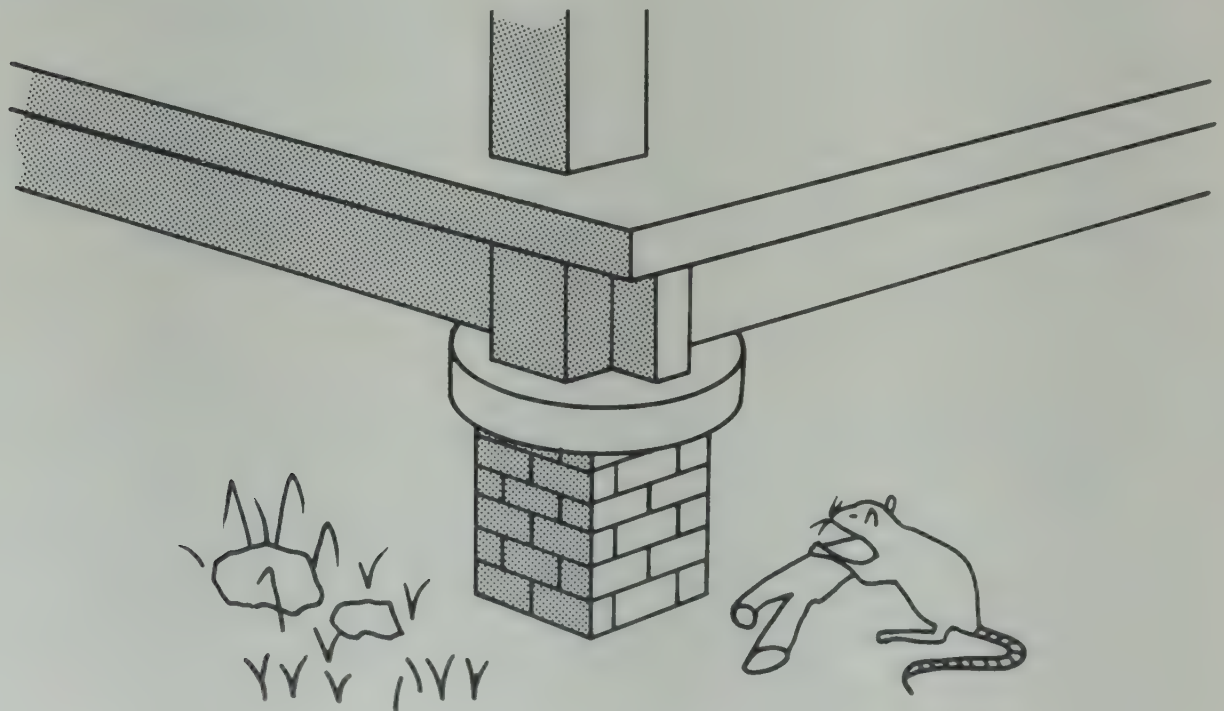
**Pest proofing** To pest proof your store means to stop the pests getting into it. There are four main groups of pests: bats, rats, winged insects and termites. It is important to keep them out of the store.

### **Bat proofing:**

If the store has a space between the ceiling and the roof, cover all the openings with fine wire mesh. This keeps the bats out.

### **Rat proofing:**

Make sure there are no holes in the walls or gaps under the door. If you are making a special building, the best way to rat proof it is to raise it up on stone mushrooms like this:

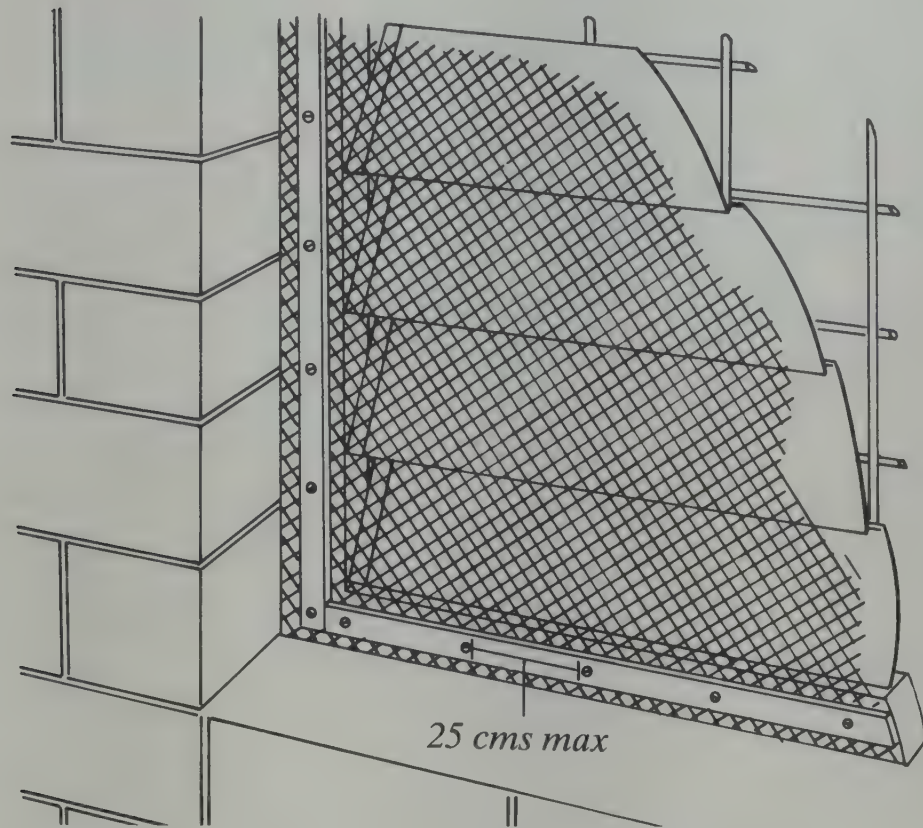


It is important to keep the building off the ground to clean underneath it. Cover the area around and underneath the building with gravel or short grass. This reduces the amount of dust from passing vehicles.



## Winged insects:

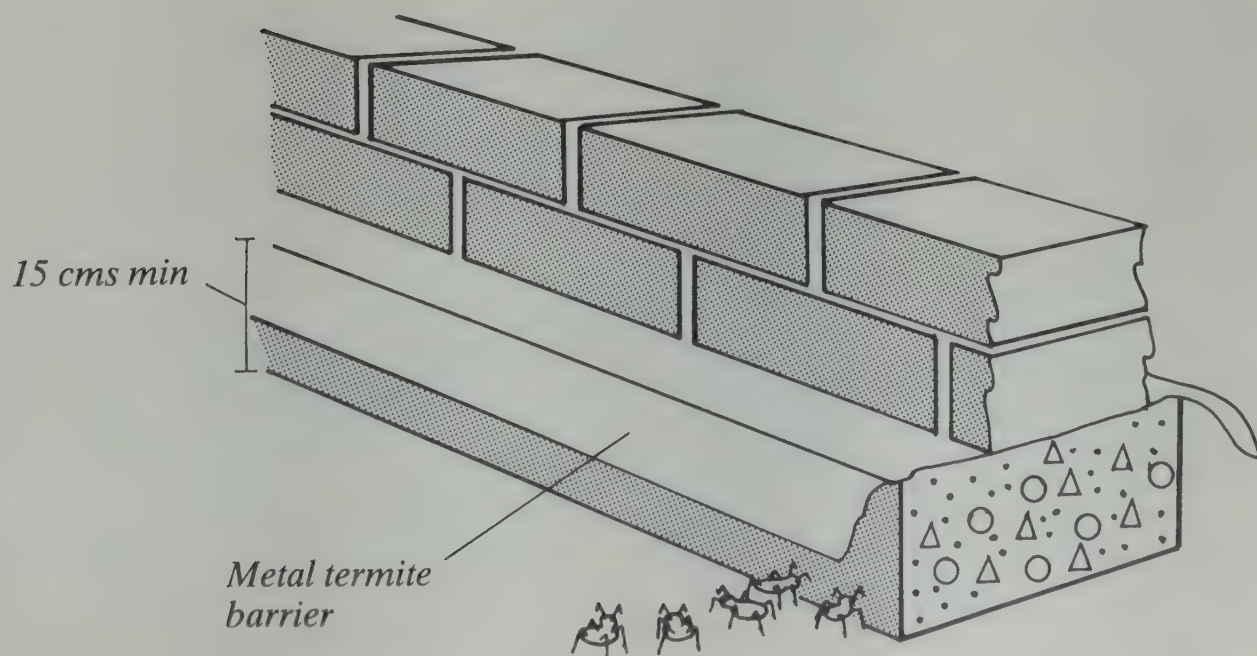
In an existing building make sure there are no holes in the walls, floor or ceiling. Keep all stores clean, especially if you are storing food. Fit the windows and gable louvres with mosquito mesh. Fit the mesh to a wooden frame, and screw it to the outside of the window, as shown in the diagram below.



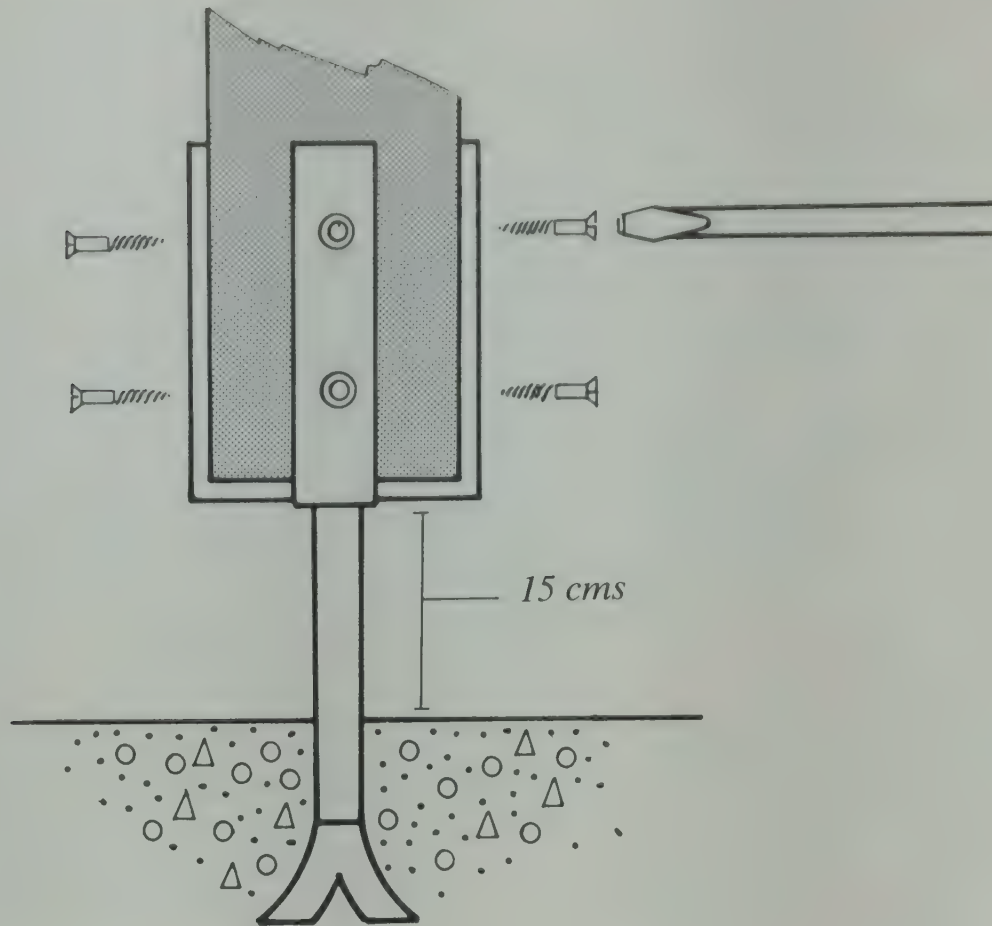
## Termites:

Termites cause damage to the building and the stock. You can deal with them in three ways:

1. You can treat the timber. It is useless to apply preservative by painting it on. All timber in the building should be pressure impregnated with preservative. If this is not possible, soak the cut timber for 24 hours in the preservative. Make sure that the preservative soaks into the cut ends of the wood.
2. Physical barriers. In a new building you can use a termite proof course. This is done as follows:

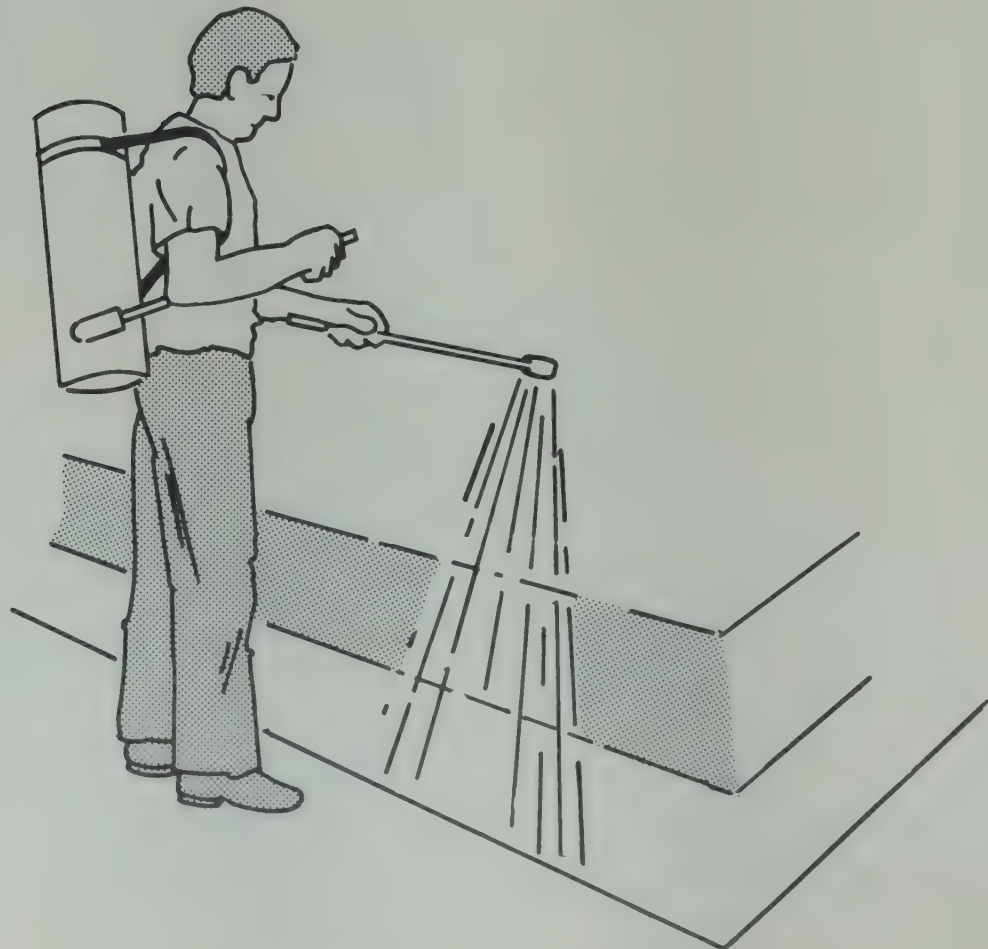


Where timbers stand on the ground, you can use metal shoes as shown in the diagram.



These shoes stop the termites from reaching the timber.

3. Insecticides. For new buildings you can also poison the ground around the store using 0.3 per cent Dieldrin solution. Spray this on the ground at the rate of 4.5 litres per square metre to an approximate depth of 15 cms. You can also paint it onto existing surfaces.





4. Infestation. If your store becomes infested with pests, you must kill them all. Here are some ways:

**Poison** — for rats, bats and mice . Place the poison where only the pest can reach it.

**Cats** — cats eat rats and mice.

**Insecticides** — spray or powder insecticide, to kill termites, cockroaches and winged insects.

Once you clear these pests from the store, keep it clean. A clean store keeps away pests.

**Electricity:** A store needs at least two power points if you have electricity:

One with a permanent connection for a refrigerator.

The other to fit a plug for any other equipment.

If there are no power points in the store ask a qualified electrician to put them in.

In the cupboard which contains dangerous drugs fit a red light which comes on when the door is opened.

Put lights above the passageways and a security light on the outside of the building. If there is no electricity, hang kerosene lamps on hooks. Hang them so that the heat from the lamps does not cause a fire or damage the supplies.

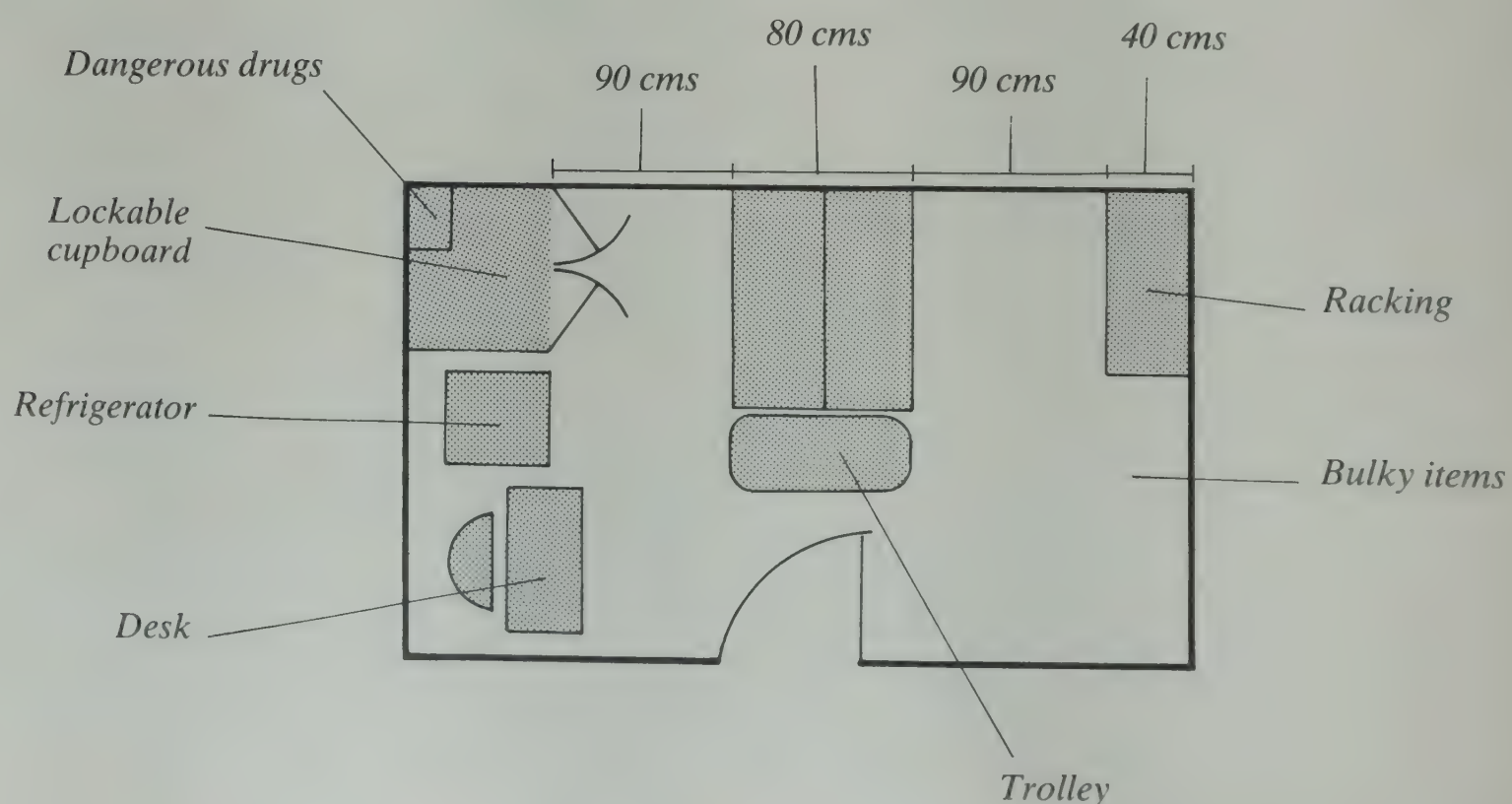
## Section 2

# How to organize the store

**This section explains how to arrange the store so that you make the best use of the space.**

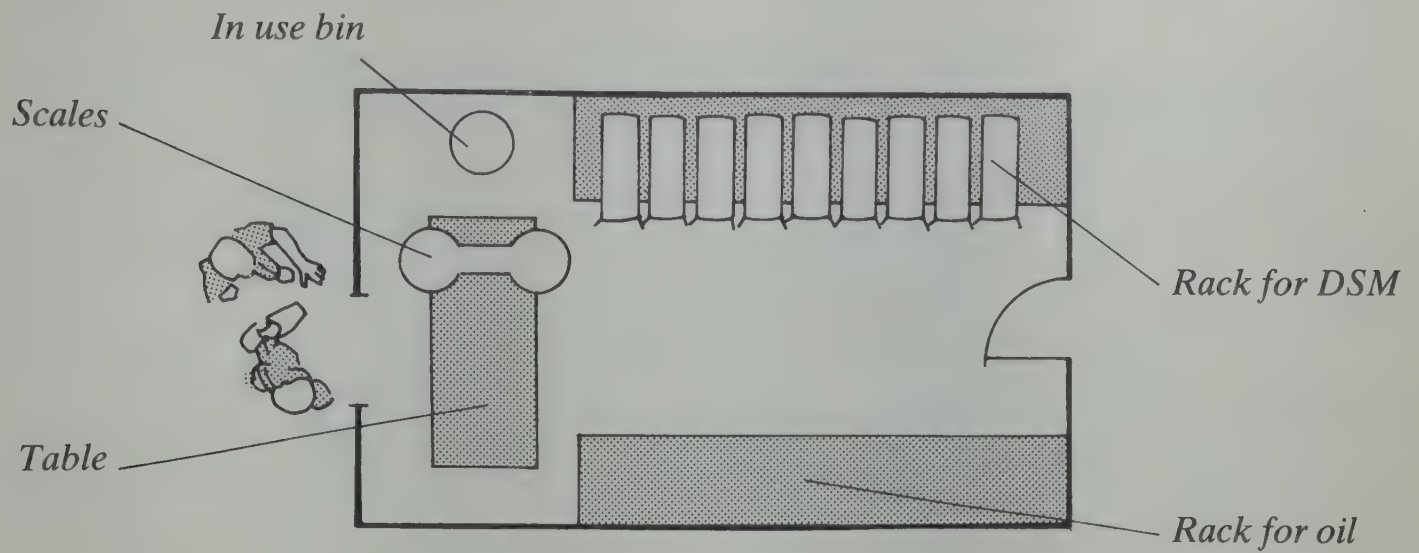
## Layout

Many supplies are stored on shelves. Arrange them in lines with a passage way not less than 90 cms wide. If you put shelves all round the edge of the room, you waste a lot of space in the middle. A good arrangement is shown in the following diagram.



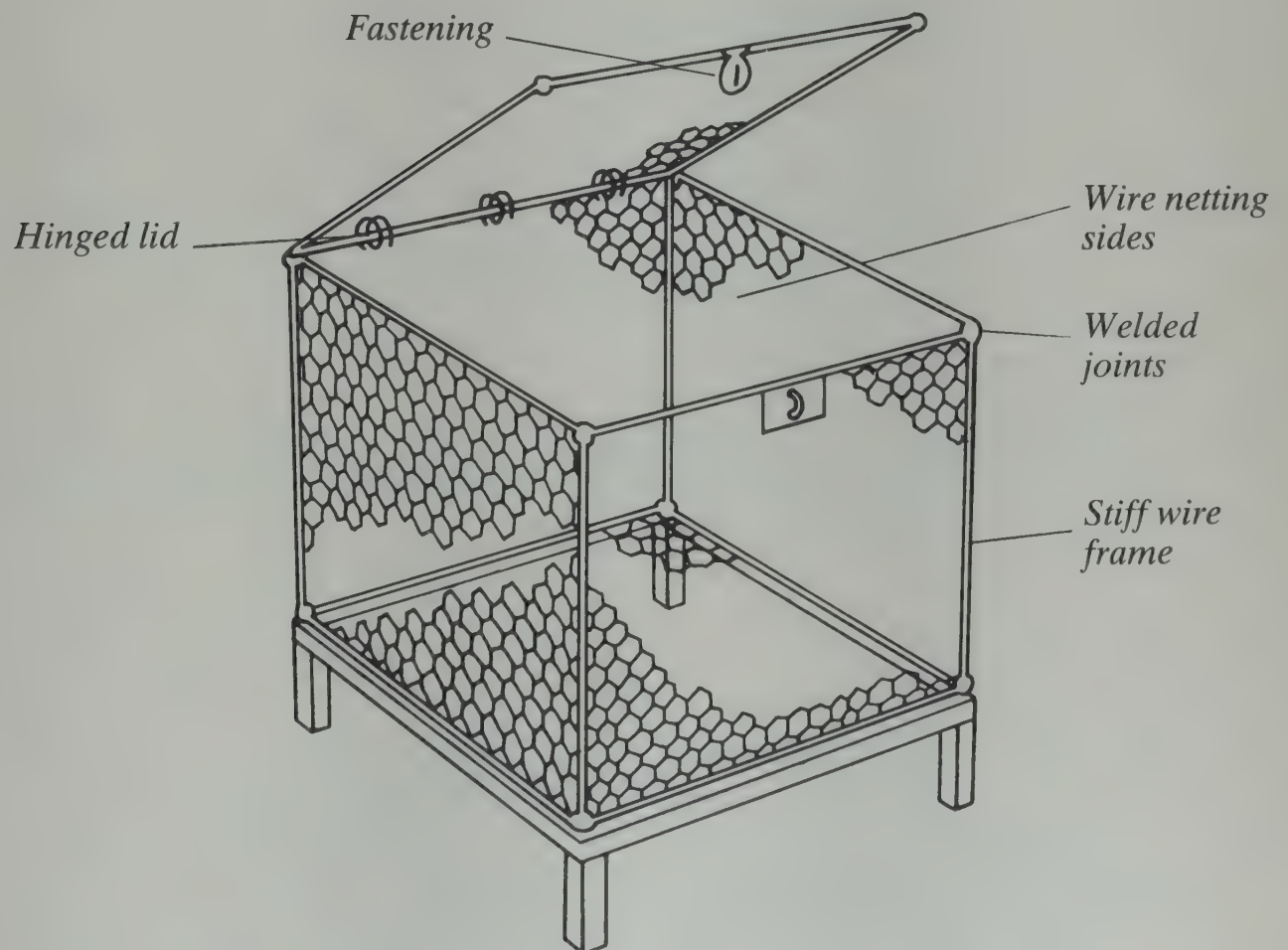


Store bulk food like dried skimmed milk (DSM) in a separate store. Make sure there is space for breaking the bulk of the DSM.



To keep food in good condition store it off the ground. If you spill any clean it up at once. Keep it as dry as possible. Make sure that:

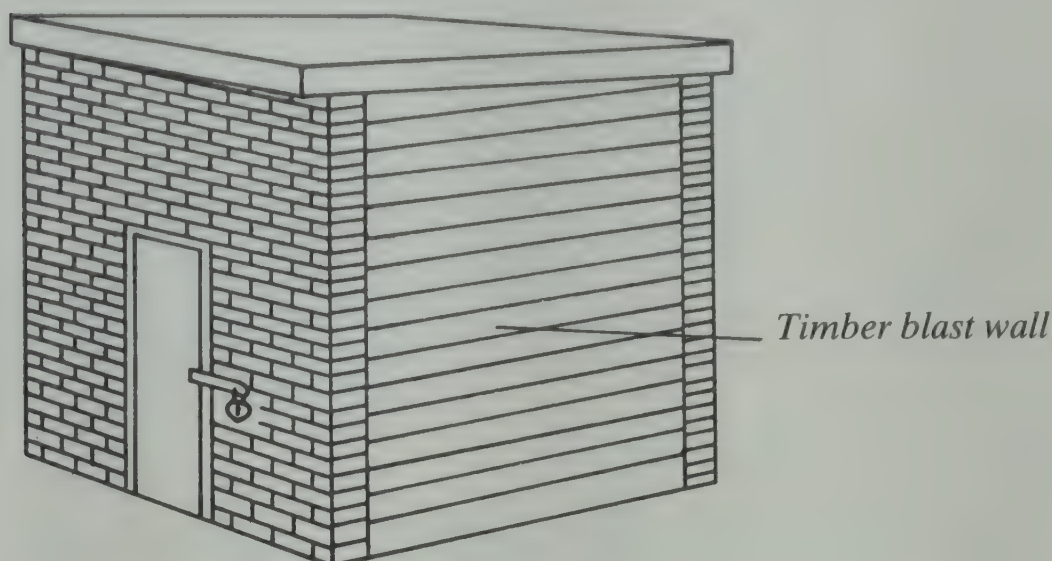
- there are no holes in the roof
- you put the contents from broken bags into new bags and seal them. Keep good empty bags for this purpose.



If rats are a problem in your area, for protection place the food inside a wire cage like this:

## Fuels

If you have a large quantity of fuel, keep it in a separate store. This should be not less than 20 m away from other buildings. One wall or the roof should be of lightweight materials. So if there is an explosion, the force follows the line of the lightest material. This reduces the damage.



## Dangerous drugs

Store dangerous drugs very carefully. Keep them in a special poison cupboard with a double lock. If you do not have a special cupboard, use a cupboard which is inside another cupboard. You should be able to lock both cupboards. The cupboard should have a light (see page 9).

## Temperature controlled supplies

You must keep some supplies cold, such as vaccines, sera and anti-toxins. You need a refrigerator for storing these. Do *not* use the refrigerator for food and drink. Open it as little as possible. The refrigerator should be raised off the ground and six inches/15 cms away from the wall. If it is a kerosene or gas model keep it from any draughts. Refrigerator care is described in *How to look after a refrigerator* by Jonathan Elford and in several WHO publications (see Annex V).

A list of models suitable for storing vaccines is published by UNICEF (see Annex V).

There is a guide by WHO to help you decide how big the refrigerator should be. There is also a repair manual which shows you how to repair breakdowns (see Annex V).

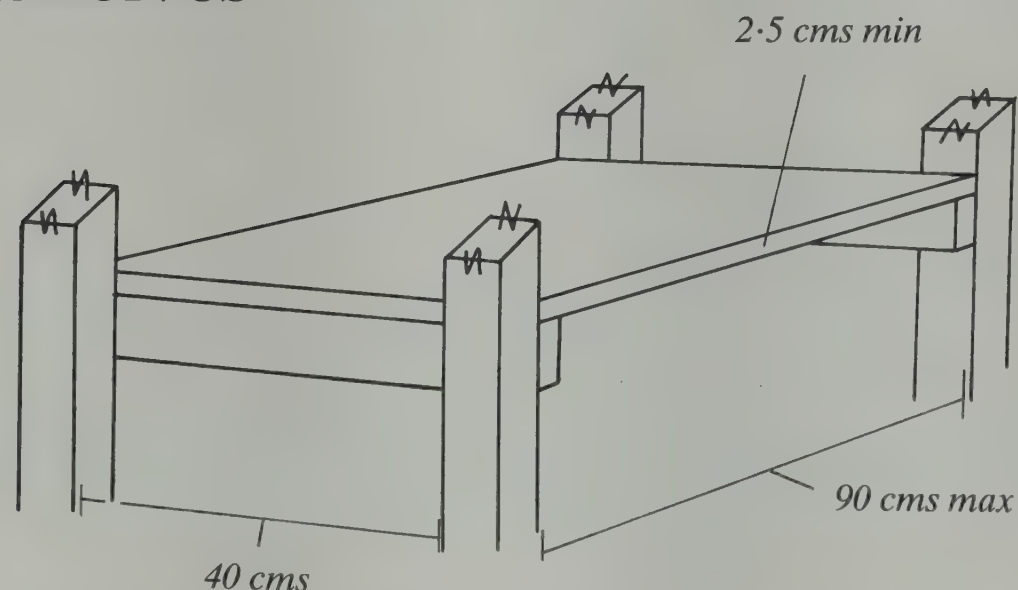


## Section 3

# What equipment is necessary

This section describes equipment you need, the size of the equipment and how to make it.

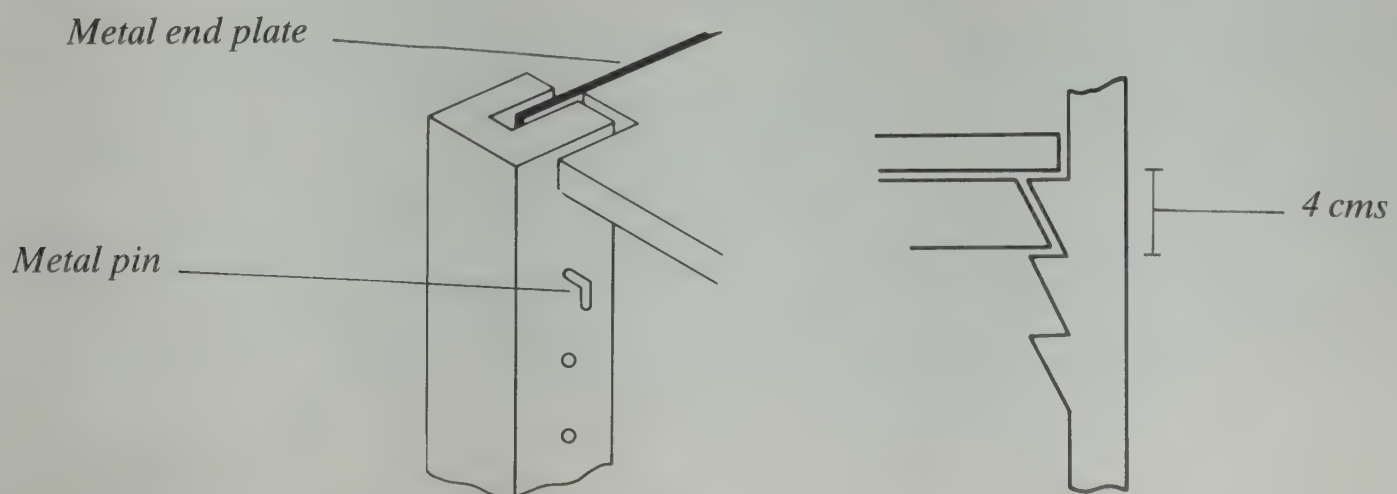
## Shelves



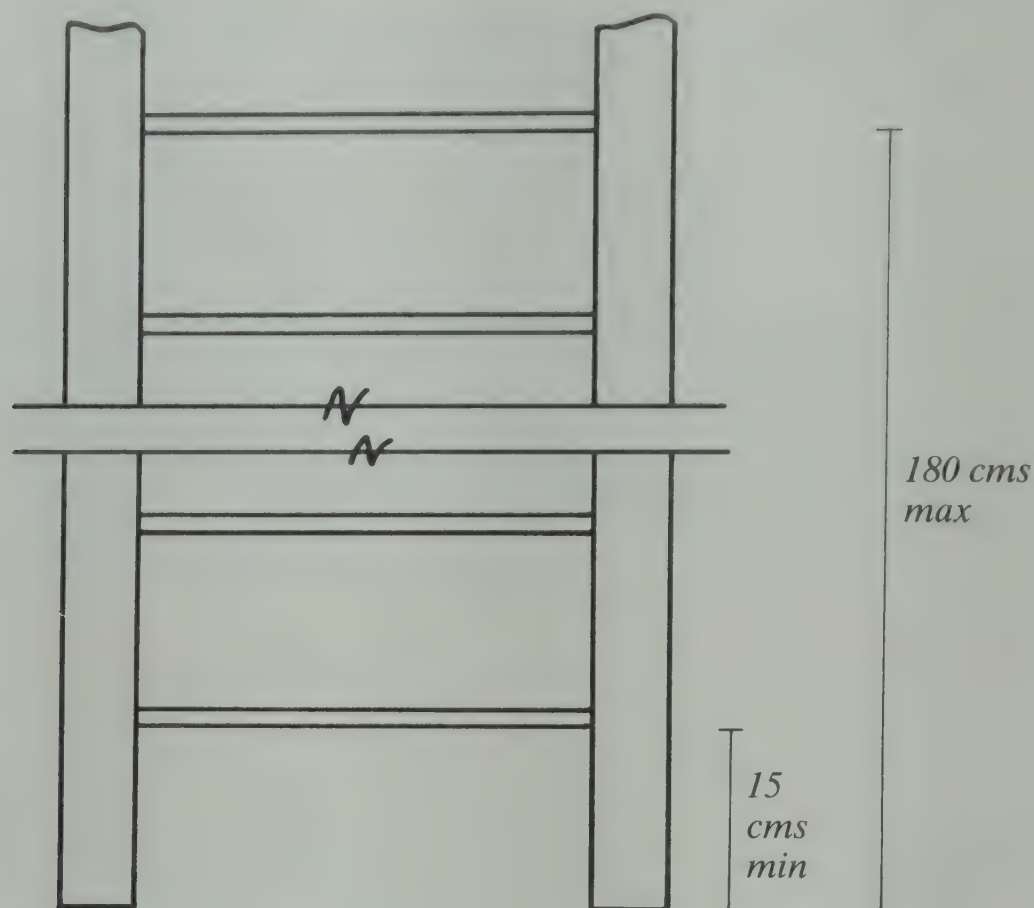
The above diagram shows the maximum measurements for wooden shelving. If the supports are too far apart, shelves sink in the middle. If the shelves are too deep, it is difficult to reach items at the back.

### Adjustable wooden shelves

The same sizes apply as above. Various adjustments are shown here.

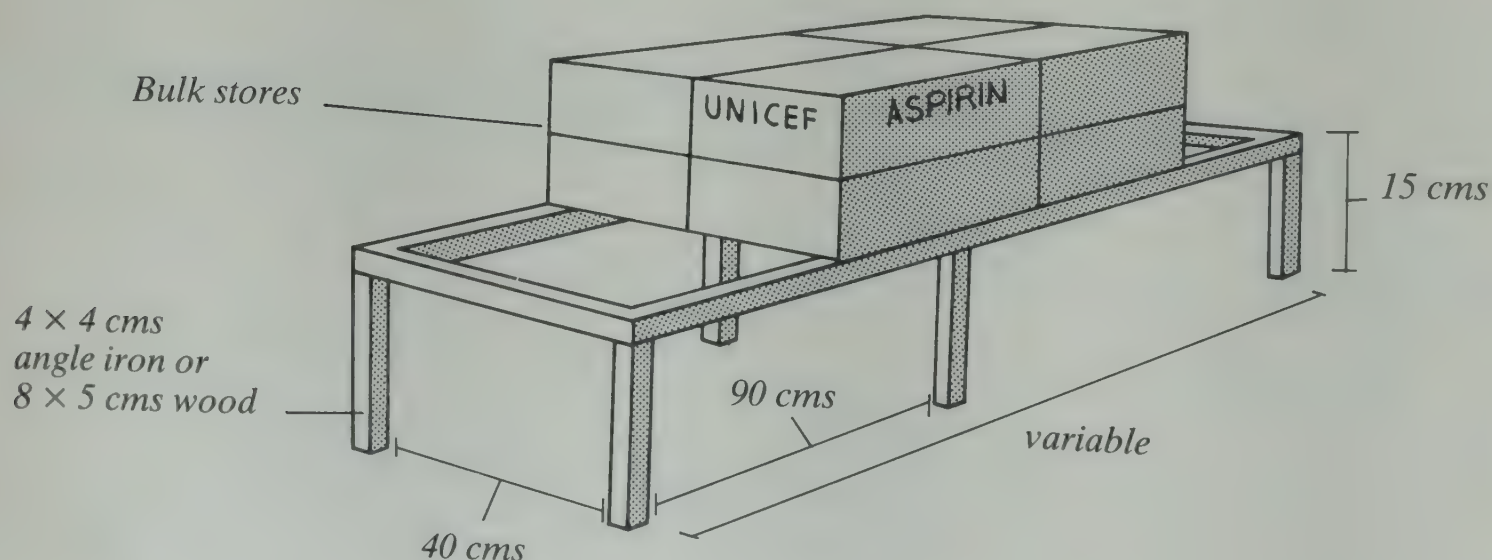


**Metal shelving** There are several factory made shelving systems which use angle iron frame. You can make the shelves from local wood.



Build the bottom shelf 15 cms above the floor, so that you can keep the floor clean. Build the top shelf no more than 180 cms above the floor. Otherwise it is difficult to reach items which you store there.

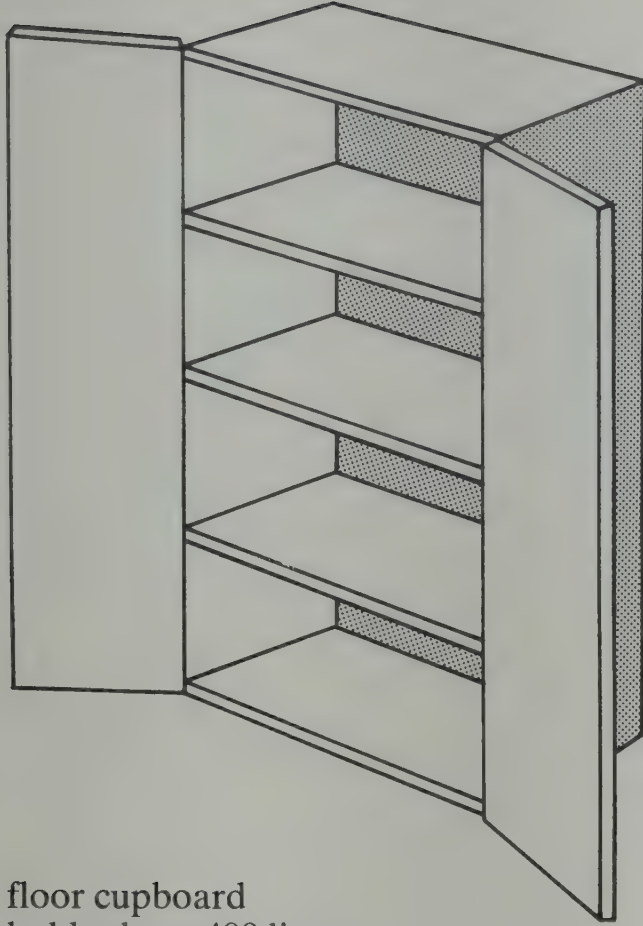
Put bulk items on simply made metal or wooden frames. Stand these away from the wall so that you have a clear space all round them. This prevents termites getting into the supplies. The frame looks like this:



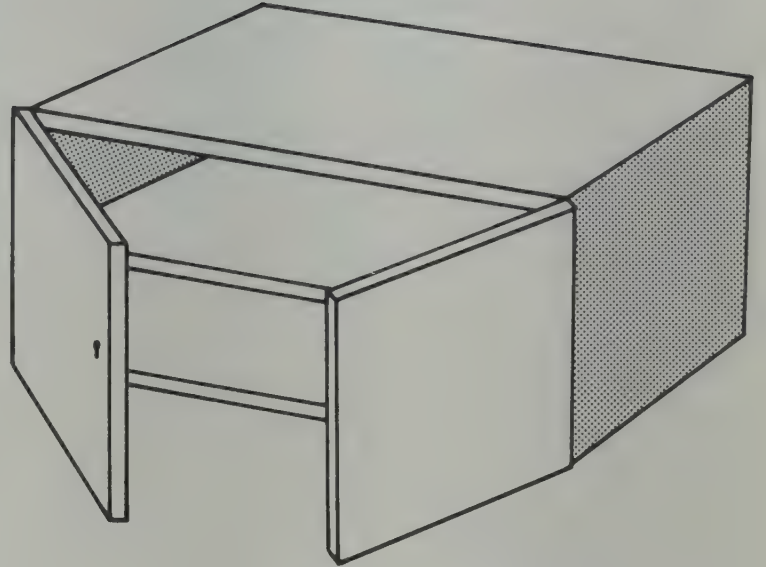
If you cannot reach items on the top shelf, stand on a stool or pair of steps. Do not stand on the shelves.



## Cupboards



floor cupboard  
holds about 400 litres.

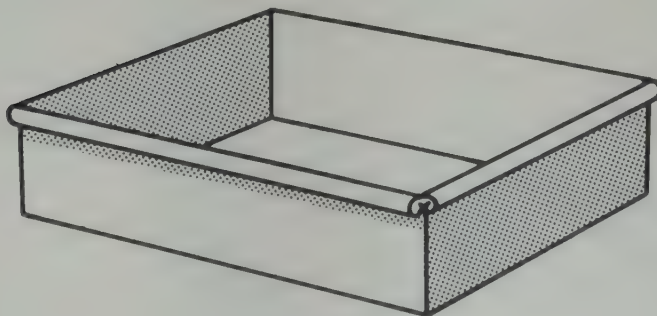


wall cupboard  
holds about 40 litres.

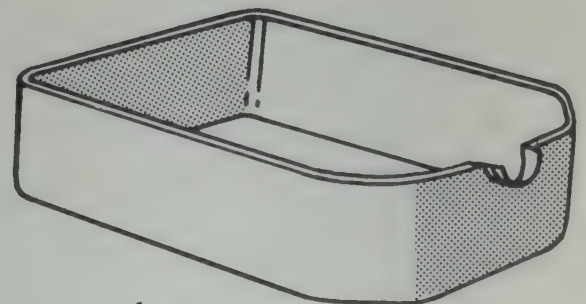
These are the two types of cupboard which you may need. You need cupboards to store supplies which you must keep secure and free from dust or light. You should be able to lock them and adjust the shelves. If they are made from wood they should be raised up off the floor.

## Containers

You can make simple containers to hold small items of equipment. To do this, cut plastic or metal containers in half.



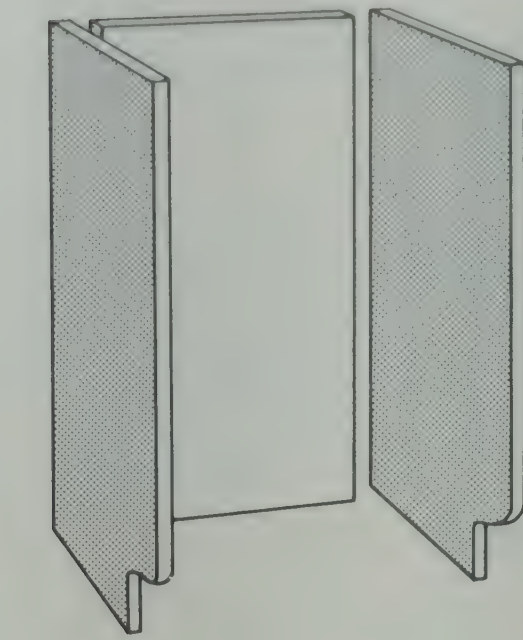
*metal*



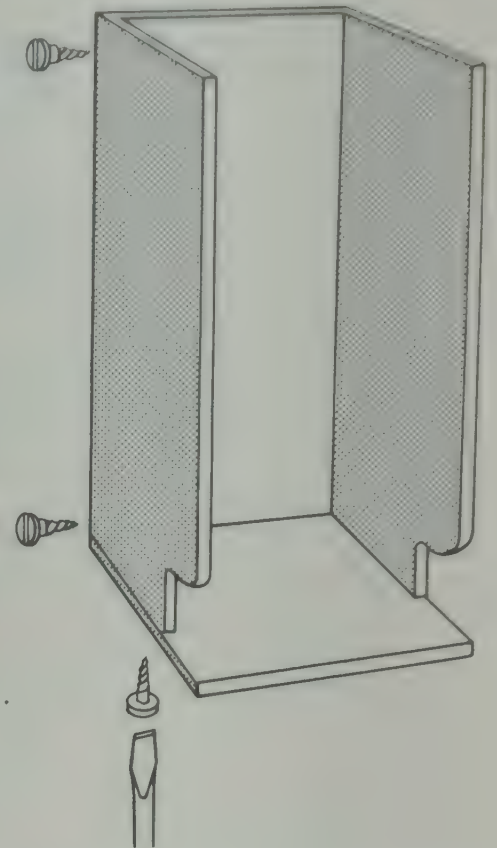
*plastic*

It is especially important to store small items carefully. You can easily lose or break them. One way of doing this is to make a dispenser.

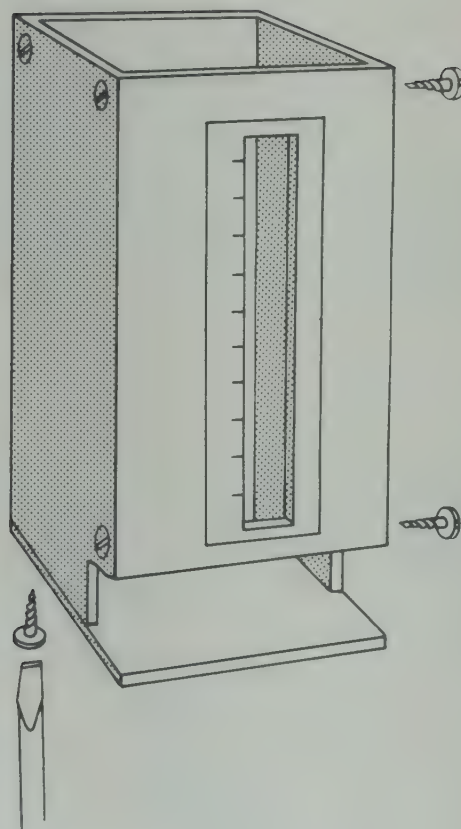
How to make a dispenser from plywood.



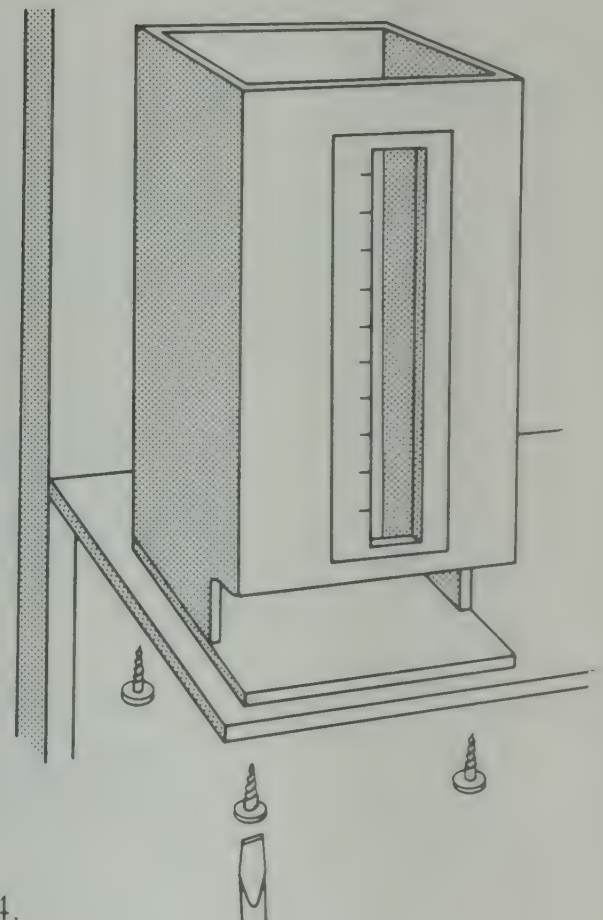
1.



2.



3.



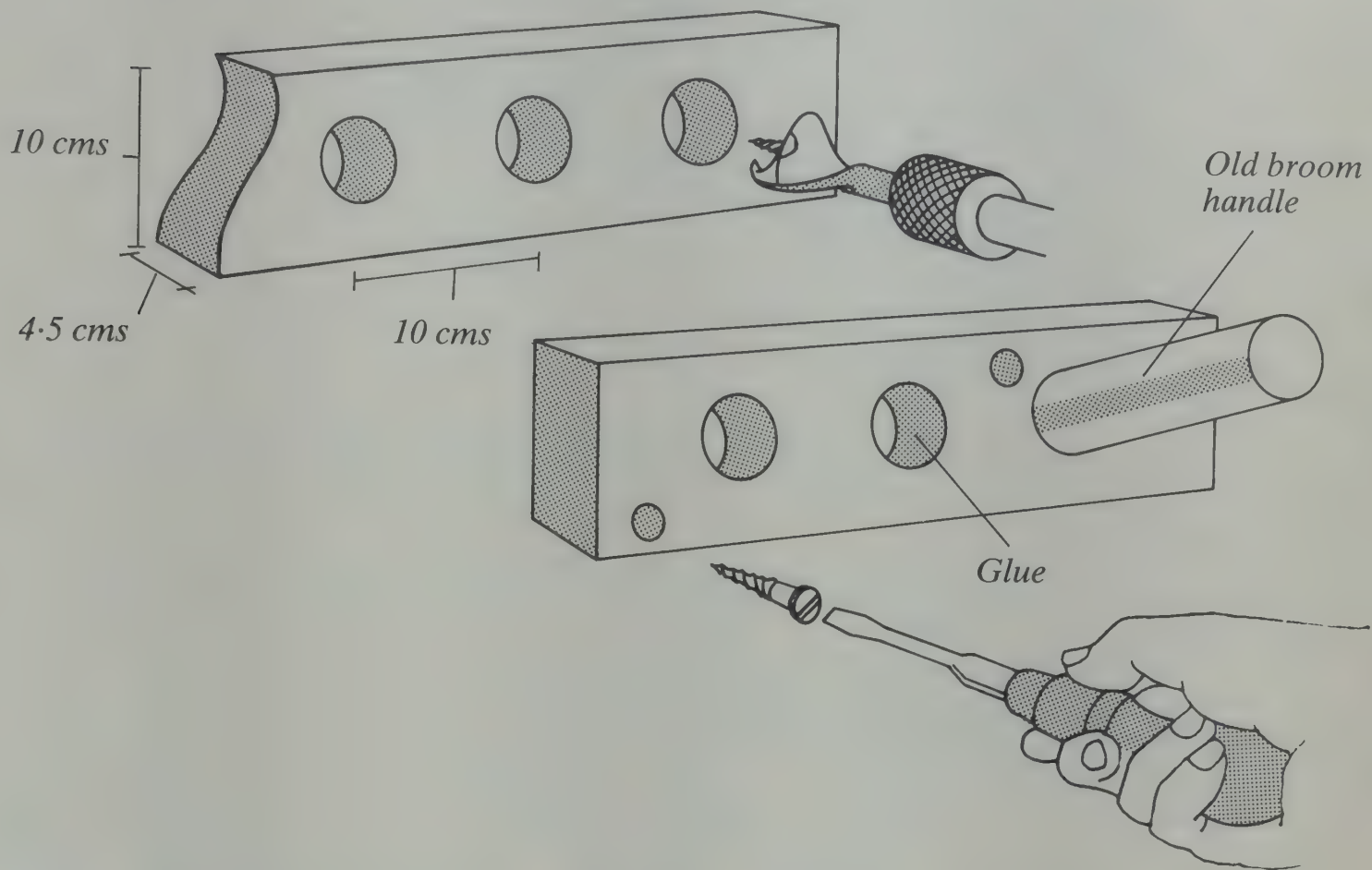
4.

To make the scale, stand 10 of the items to be dispensed against a card. Then mark a pencil line at the site of each one. This can be put onto the dispenser and shows how many are in the dispenser.

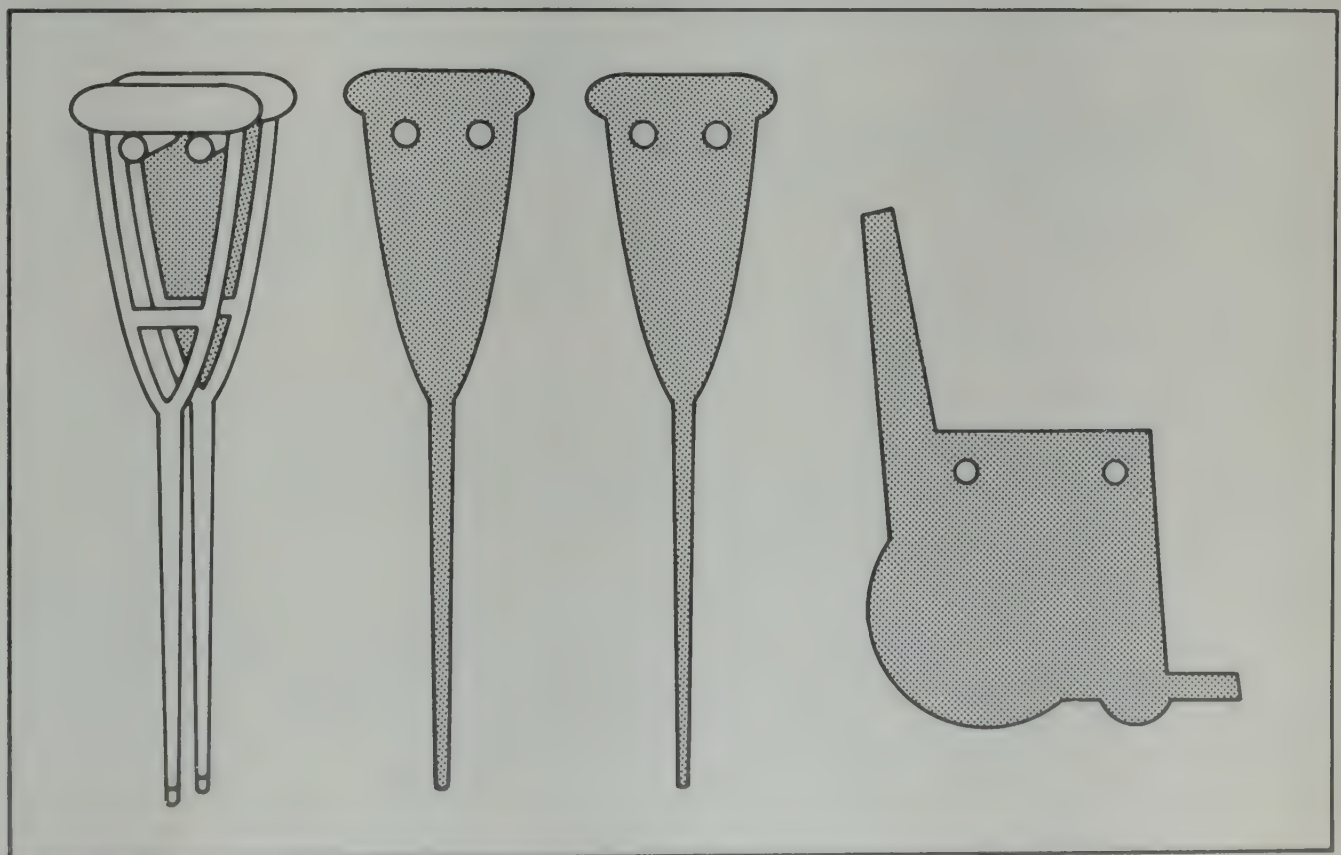


## Hooks

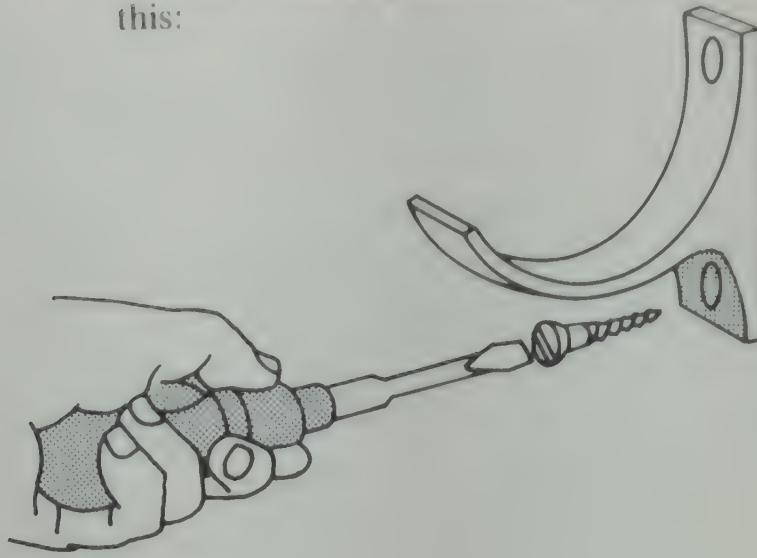
You can hang some items on the walls of the store. These include large items like crutches and stretchers or long items like tubing. You can make a simple hook rack as follows:



Where particular items like crutches hang, paint an outline of the item on the wall. Then you can see when the item is missing.

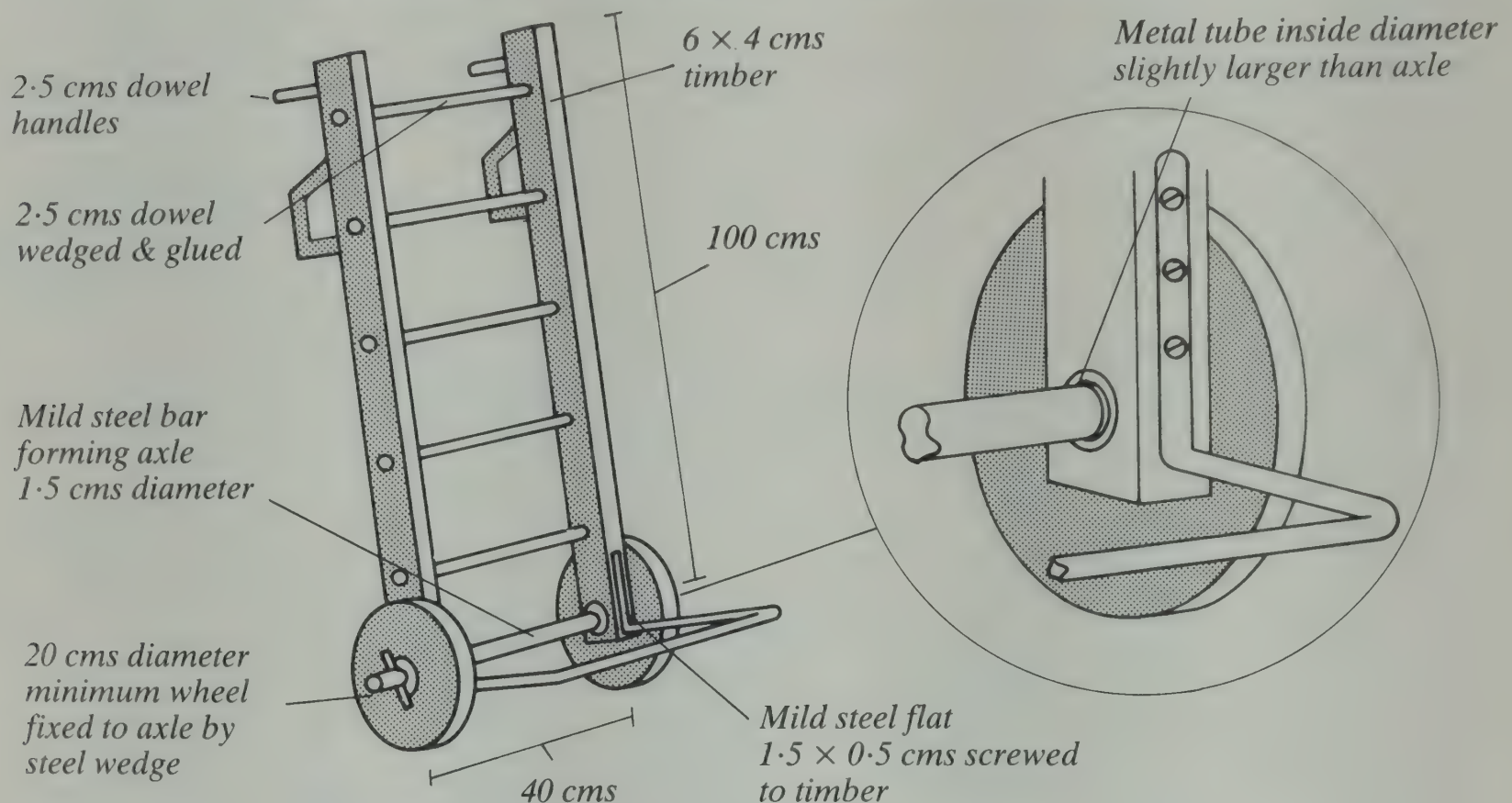


You can make a good hook for these things from a galvanized gutter bracket like this:



## Trolleys

You need at least one trolley to move supplies about in the store. You also need a sack trolley for moving large items. A simple sack trolley looks like this:



## Refrigerator

You need a refrigerator to store your vaccines, sera and some drugs. To find the size that you need, divide the population your health centre serves by 3,500. This gives you the volume you need in litres. For example a clinic serving 20,000 people needs  $20,000 \div 3,500 = 5.7$  say 6 litres. You must also make sure that you can make enough ice.

For example if you have 2 vaccinators working away from the clinic every day, they need 2 litres of ice each day. So your refrigerator has to freeze 4 litres of ice in 24 hours. You must choose a refrigerator which makes this much ice. You will find that it holds much more than 6 litres.

To find suitable refrigerators check the UNICEF SUPDIR catalogue (see Annex V).

You must record the temperature inside the refrigerator twice a day and mark it on a record like the one shown in Annex VI.



# Section 4

## How to obtain supplies

### This section explains how to:

- calculate the quantities of supplies you need
- decide your supply period and method of supply
- place your order
- pack your supplies
- receive your supplies.

## Calculating quantities of supplies

There are ten main types of supplies that you need to obtain for your clinic:

- drugs (including vaccines)
- contraceptives
- food
- dressings
- consumables
- domestic items
- laboratory supplies
- stationery
- spare parts
- non-expendible equipment

In addition you need to obtain essential items of equipment from time to time. WHO have published a book called *On Being in Charge* (see Annex V). This explains how to manage drugs and equipment. WHO has also produced a management course on logistics and the cold chain (see Annex V).

**Drugs** You probably have a standard list of drugs like the one shown on page 23. This section explains how to decide for the first time how much you need.

The following three tables show you:

1. The types of illness, a calculated number of cases and suggested drug treatment.
2. A standardized treatment course.
3. How many drugs you need over three months for a population of 10,000.

Use Tables I and II only to calculate your needs. They are not for making prescriptions.

Use these as a basis to discuss your needs with someone from another health centre. If there is no health centre nearby, use the list in Table III for the first time you order. Then change it as follows:

- check for each drug how much you used during the supply period.
- check this again by checking the number of patients you treated and what dose you gave them. If there is a difference between the two figures, this may show you what your wastage is. For example:  
from your stock records you find that you issued 4,000 aspirins. But you only treated 500 patients with 6 tablets each (i.e. 3,000 aspirins). There are 1,000 tablets you cannot account for. Check to see how many are in the dispensary, say 600. You now know that you have wasted 400 ie. 10 per cent.
- add this wastage figure to the quantities issued (i.e.  $4,000 + 400 = 4,400$ ). This gives you the quantity you should order. Remember, order only complete tins. So if you need  $4\frac{1}{2}$  tins of aspirin, order 5.
- make sure you have enough drugs for a reserve. This means adding about 25 per cent to your *first* order. Then increase each supply period by the amount used and by the wastage.
- remember – many drugs have an expiry date. And all lose their strength with time, so do not order too much. In Annex I there is a list of 33 drugs showing the recommended storage conditions, their stability characteristics and signs of deterioration.



**Table 1** – Types of illness, calculated number of cases, and drug treatment for a population of 10,000 over 3 months

Symptoms	Predicted “incidence” of symptoms		Predicted no. of contacts and suggested drug treatment
	%	No. of Cases	
<b>Age 0-14 yr (5,000 people):</b>			
Respiratory	30	1,500	Upper respiratory tract: Paracetamol tablets (400) Acetylsalicylic tablets (350) Lower respiratory tract: Phenoxymethylpenicillin syrup (300) Phenoxymethylpenicillin tablets (350) Benzylpenicillin injections (100)
Diarrhoea	20	1,000	Oral rehydration sachets
Malaria	13	650	Chloroquine syrup
Helminths	10	500	Piperazine syrup (500) Mebendazole tablets (200)
Skin, trauma	10	500	Benzyl benzoate lotion (200) Benzoic acid and salicylic acid ointment (100) Iodine or chlorhexidine solution (200)
Anaemia/malnutrition	8	400	Ferrous salt and folic acid tablets (400) Vitamin A capsules (400)
Eyes	5	250	Sulphacetamide ointment
Ears	4	200	Ampicillin syrup
<b>Age 15 yr and above (5,000 people):</b>			
Respiratory	20	1,000	Upper respiratory tract: Acetylsalicylic acid tablets (700) Lower respiratory tract: Tetracycline tablets (300)
Musculoskeletal	15	750	Acetylsalicylic acid tablets (500) Paracetamol tablets (250)
Digestive	15	750	Piperazine (300) Mebendazole tablets (200) Aluminium hydroxide tablets (250) Senna tabs (200)
Diarrhoea	15	750	Oral rehydration sachets
Genitourinary	12	600	Sulphadimidine tablets (300) Procaine benzylpenicillin injections (300)
Malaria	10	500	Chloroquine tablets
Skin, trauma	5	300	Benzyl benzoate lotion (150) Gentian violet (50) Chlorhexidine (25) Iodine solution (25) Tetracycline ointment
Anaemia/malnutrition	5	250	Ferrous salt and folic acid tablets (250) Vitamin A capsules (250)
Eyes	3	150	Sulphacetamide ointment

**Table II – A standardized treatment course**

Drug	Form	Course	Quantity per course	Remarks
Acetylsalicylic acid	Tablets 300 mg	Adults: 2 t.d.s. x 2 days Children: ½-1 t.d.s. x 2 days	12 tablets 6 tablets	Assumes single dose intervention
Aluminium hydroxide	Tablets 500 mg	Adults: 1 q.d.s. x 5 days	20 tablets	
Ampicillin	Syrup 125 mg/5 ml	Children: 125 mg q.d.s. x 5 days	1 bottle	
Benzoic acid and salicylic acid	Ointment 25 g			
Benzyl benzoate	Solution 25%	All: 100 ml	100 ml	
Benzylpenicillin	Injection 0.6 g (1 million IU)	Children: 1 daily x 5 days	5 vials	
Chloroquine	Tablets 150 mg/base Syrup 50 mg/5 ml/base	Adults: 4 stat Children: 10 mg/kg	4 tablets Average 15 ml	
Ferrous salt and folic acid	Tablets 60 mg/base	Adults: 1 b.d. x 10 days Children: 1 o.d. x 10 days	20 tablets 10 tablets	
Gentian violet	25 g bottles			
Iodine/chlorhexidine	Solution 2.5%/5%			
Tetracycline	Ointment 25 g	All: b.d. x 7 days	1 tube	For treatment of roundworms
Oral rehydration	Sachets 27.5 g/litre	All: 3 packets	3 sachets	
Paracetamol	Tablets 500 mg	Adults: 2 t.d.s. x 2 days Children: ¼-½ t.d.s. x 2 days	12 tablets 4 tablets	
Piperazine	Tablets 500 mg Syrup 500 mg/ml	Adults: 8 stat Children: 20 ml stat	8 tab 20 ml	
Phenoxymethylpenicillin	Syrup 250 mg/5 ml Tablets 250 mg	Children: 125 q.d.s. x 5 days Children: 125 mg q.d.s. x 7 days	1 bottle 14 tablets	
Procaine benzylpenicillin	Injection 3 g (3 million IU)	Adults: 1 stat	1 vial	
Vitamin A	Capsules 200,000 IU	All: 1 stat	1 capsule	
Senna	Tablets 7.5 mg	Adults: 2 stat	2 tablets	
Sulphacetamide	Ointment 10% 5 g tube	All: q.d.s. x 7 days	1 tube	
Sulphadimidine	Tablets 500 mg	Adults: 2 b.d. x 5 days	20 tablets	
Tetracycline	Tablets 250 mg	Adults 1 q.d.s. x 7 days	28 tablets	
Thiabendazole	Tablets 500 mg	Adults: 3 b.d. x 2 days Children: 1 b.d. x 2 days	12 tablets 4 tablets	

o.d. = *once daily*;      b.d. = *twice daily*;      t.d.s. = *3 times a day*;      q.d.s. = *4 times a day*;      stat = *at once*.



**Table III** – Basic drugs you need for 3 months for 1,000 patients per month, i.e. a population of 10,000.

Drug	Pharmaceutical form and strength	Total required for 3 months*
<b>Analgesics (2):</b>		
Acetylsalicylic acid	Tablets 300 mg	20,000 tablets
Paracetamol	Tablets 500 mg	6,000 tablets
<b>Antihelminthic (7.2):</b>		
Piperazine	Tablets 500 mg	3,000 tablets
Piperazine	Syrup 500 mg/5 ml	12 litres
Mebendazole	Tablets 100 mg	4,500 tablets
<b>Antibacterial (7.3):</b>		
** Ampicillin	Syrup 125 mg/5 ml	500 bottles
** Benzylpenicillin	Injection 0.6 (1 million IU)	600 vials
Phenoxymethylpenicillin	Tablets 250 mg	6,000 tablets
Phenoxymethylpenicillin	Syrup 250 mg/5 ml	350 bottles
** Procaine benzylpenicillin	Injection 3.0 g (3 million IU)	350 vials
Sulphadimidine	Tablets 500 mg	7,000 tablets
** Tetracycline	Tablets 250 mg	10,500 tablets
<b>Antimalarial (7.6):</b>		
** Chloroquine	Tablets 150 mg/base	2,500 tablets
** Chloroquine	Syrup 50 mg/5 ml base	12 litres
<b>Anti-anaemia (11.1):</b>		
Ferrous salt and folic acid	Tablets 60 mg iron with 0.25 mg folic acid	10,500 tablets
<b>Dermatological (14):</b>		
Benzoic acid and salicylic acid	Ointment 25 g tube	120 tubes
Benzyl benzoate	Lotion 25%	30 litres
Gentian violet	Crystals	250 g (10 bottles)
Tetracycline	Ointment 25 g	60 tubes
<b>Antacid (17.1):</b>		
Aluminium hydroxide	Tablets 500 mg	6,000 tablets
<b>Cathartic (17.5):</b>		
Senna	Tablets 7.5 mg	600 tablets
<b>Diarrhoea (17.6.2):</b>		
** Oral Rehydration Salts	Sachet 27.5 g/litre	6,500 sachets
<b>Anti-infective (21.1):</b>		
Sulphacetamide (ophthalmological)	Ointment 10%, 5 g tube	500 tubes
<b>Solutions (26):</b>		
** Water for injections	2 ml	600 amps
** Water for injections	10 ml	600 amps
<b>Surgical disinfectants (27):</b>		
Chlorhexidine	Solution 5%	12 litres
Iodine	Solution 2.5%	6 litres
<b>Vitamins (28):</b>		
Vitamin A	Capsules 200,000 IU	1,500 capsules

Figures in ( ) refer to WHO classification.

\* Amounts are to the nearest 500 for tablets and sachets.

\*\* Life saving drugs – Diluent whilst not itself life-saving, is necessary for the reconstitution of penicillin.

Based on material published by Stephanie Simmonds in *The Lancet*, Vol 1, 435-6

**The vaccines which you require include:**

BCG	Tuberculosis
DPT	Diphtheria, Pertussis, Tetanus
DT	Diphtheria, Tetanus
TOPV	Trivalent oral polio vaccine
Measles	
TT	Tetanus Toxoid

**You may also have:**

Rabies	
Yellow fever	
Cholera	
CSM	Cerebral spinal meningitis

Heat, light and time destroy vaccines. So it is important that you have a refrigerator and keep just the right amount in your store. Use the following tables to calculate your needs. If you do not know how many immunizations you carry out in a supply period make a calculation. Then correct it for the next time.

**BCG**

Doses		
*Immunizations per Supply Period	Minimum Stock	Maximum Stock
<20	20	60
30	20	80
40	20	100
50	20	120
60	40	140
80	40	160
90	40	180
105	40	200
115	60	240
125	60	260
145	60	280
160	60	300
170	80	340
180	80	360
190	80	380
200	80	380
210	80	400
220	100	440
230	100	460
250	100	480
260	100	500
280	120	540
290	120	560
300	120	580
320	120	600
330	140	640
340	140	660
350	140	700

*\*This is based on a 50% wastage, a reserve stock of 25%, vial size 20 dose.  
1 clinic session per supply period.*



# DPT/TOPV/DT/TT/Measles

Doses		
*Immunizations per Supply Period	Minimum Stock	Maximum Stock
<25	20	60
35	20	80
50	20	100
65	20	120
80	40	140
90	40	160
100	40	180
110	40	200
130	40	240
150	60	260
165	60	280
180	60	300
190	60	320
200	80	340
210	80	360
230	80	380
240	80	400
255	80	440
272	100	460
285	100	480
300	100	500
312	100	520
320	100	540
333	120	560
345	120	580
360	120	600
370	120	620
385	120	640
400	140	660
410	140	680
420	140	700

*\*This is based on a 30% wastage, a reserve stock of 25%  
Vial size is 10 or 20 dose. One clinic session per supply period.*

Remember the minimum number of vials in stock should never be less than the number of clinic sessions per supply period + 1. For example, if there are 2 clinics per supply period, but only a total of 30 immunizations, you need 2 vials (40 doses) and 1 vial (20 doses for reserve).

**Contraceptives** The contraceptives which you probably stock are:

- pills
- condoms
- injectables
- IUD's (Intra-Uterine devices)

The number of people who use each type of contraceptive is different according to the policy in your country. The following guide helps you make your first calculation.

Contraceptive	% of people who use it
Pills	40 – 50
Condoms	10 – 15
Injectables	15 – 20
Others (including IUD)	20 – 30

The following table helps you to calculate how many you require.

**\*Pills and Condoms**

Number of cycles/condoms which you issued in last supply period	Stock levels (cycles/condoms)	
	minimum stock	maximum stock
<50	15	70
100	30	140
150	45	210
200	60	280
250	75	350
300	90	420
350	105	490
400	120	560

*\*This is based on a 10% wastage, and a 25% reserve stock.*

In the quantities you may have different types of contraceptives, for example high or low dose pills, plain or coloured condoms. Make a note of the quantities of each type that you stock.

The number of IUD's you stock will depend upon demand. This may vary, so keep a minimum stock of 5 and check how many are fitted each month.



### \*Injectables

Number of injections which you gave in the last supply period	Stock levels (doses)	
	minimum stock	maximum stock
<30	10	50
60	20	100
90	30	150
120	40	200
150	50	250
180	60	300

*\*This is based on a 30% waste, a reserve stock of 25%, 10 dose vial.*

**Food** You may receive food supplements through the World Food Programme (WFP) or from other sources. These are most commonly dried skimmed milk (DSM) and cooking oil. You receive them in set quantities for a certain type of patient. For example, WFP may give four gallons of oil to each pregnant woman who attends your clinic.

Find out if you can get food. If so, find out for whom and in what quantities. Then from attendance figures at your clinic you can calculate how much you need.

You can, for example, calculate how much DSM you need as follows:

You have 400 births a year and each infant has a total of 50 kilos of DSM during its first year. You therefore need  $400 \times 50 = 20,000$  kilos of DSM during the year. But you are receiving supplies every three months. So to last three months you need  $20,000 \div 4 = 5,000$  kilos. This is a maximum you need for a quarter. During the first supply period you must check how much you actually use. This shows you how much to order next time.

**Dressings** The following list is a guide for a three months stock. Order enough stock to bring it up to these levels:

70 rolls of gauze, absorbant, non-sterile, 100 m roll

4 tins of gauze vaseline, 10 x 10 cm, tin of 12

2 rolls cotton wool, absorbant, non-sterile, 500 g roll

bandage, gauze: 50 rolls, 25 mm x 9 m roll

50 rolls, 50 mm x 9 m roll

50 rolls, 75 mm x 9 m roll

12 rolls Plaster of Paris, 75 mm x 3 m

30 rolls tape adhesive strapping, zinc oxide, 4.5 m roll

2 boxes mixed, waterproof, adhesive dressings

15 triangular bandages

**Consumables** These are also for a three months stock:

- 2 packets of applicator sticks
- 2 boxes of staples
- 500 tongue depressors (wooden)
- 4 rubber rings for microstat syringes
- 20 plastic teaspoons (5 ml)
- 6 boxes of linen sutures
- 5 reels cord ligatures unsterile
- 20 scalpel blades
- 3 boxes of needles hypodermic .7 x 38 mm regular bevel luer
- 2 boxes of needles hypodermic .45 x 10 mm luer
- 2 packets of needles, suture surgeons 10 mm circle, cutting No. 12
- 12 batteries for laryngoscope, diagnostic set and torches, auroscope and ophthalmoscope
- plastic tubing

**Domestic items** This is a check list to help you remember which items you need:

- Soap
- Disinfectant
- Cleaning cloths
- Insecticide
- Toilet paper
- Matches
- Detergent
- Razor blades
- Scouring powder
- Gas bottles – if used
- Kerosene – if used

**Laboratory supplies** The type and quantity of laboratory supplies depends upon the type and number of investigations you carry out. A health centre laboratory can only provide a good service on which you can depend, if it is closely connected with the district hospital laboratory. This helps standardization and quality control of techniques and proper maintenance of equipment. It also encourages the health centre laboratory worker.

The hospital laboratory must therefore issue the equipment, reagents and stationery for the health centre laboratory. It should also issue instructions for the use and storage of chemicals and reagents to the health centre. A guide for the safe handling and storage of flammable, corrosive and toxic chemicals is shown in Annex I. Volume I of *A Medical Laboratory Manual for Tropical Countries*, by Monica Cheesbrough (see Annex V) gives further information for setting up a health centre laboratory and the techniques which you may need.



## Stationery

This is a check list.

*Immunization cards	Graph paper
*Road to Health cards and continuation cards	Referral forms
*Mothers' cards	Typing paper and envelopes
Exercise books	Pens, pencils, pins, rubbers, staples
Store keeper's ledgers	Carbon paper
Report forms	Sellotape
**Adults' cards	Labels

\*You can calculate the quantities of these items as follows:

Take the number of newborn children who receive first immunization per month. Add 30 per cent of this number and multiply by 3. This gives the quantities you require for three months.

\*\*Use the figures in Table I (page 21) to calculate the number of cards you need. In the table there are about 10,000 attendances in three months, (i.e. your clinic serves 10,000 people and each person is sick enough to come to the clinic four times a year. So you will need about 10,000 cards to begin with.

## Spare parts

You need to keep some spare parts for your refrigerator. The type and quantity depend upon the sort of refrigerator that you have.

Before you decide which spare parts to keep consider whether:

- they are necessary
- someone has the necessary tools and can fit the part

The following table, prepared by WHO, shows the list of parts for three types of refrigerator or freezer. If any of these parts break the refrigerator or freezer does not work.

Compression type	Kerosene type	Gas type
Compressor Relay Motor protector Thermostat Filter drier Capacitor Switch (not always fitted)	Cooling unit Lamp glass Cap Burner Tube cap Wick carrier Wick Tank	Cooling unit Gas pipe Thermo-element Flame failure device Bypass screw Gas thermostat Piezo igniter Spark plug Burner jet
For electrical operation:		
	Thermostat Heater	Electric thermostat Heater

*Reproduced courtesy of WHO/EPI*

In addition to these parts, the following greatly reduce the efficiency of the refrigerator if they are damaged:

● door and lid seal

Most of these parts are not kept at a health centre but you should get them from a district store. The parts which you should keep at the health centre are:

1 door seal	}	for kerosene refrigerator
2 lamp glasses		
2 wicks		
1 flue brush		
1 wick trimmer		

When you order new equipment, make sure you order any spare parts which you need at the same time, e.g. lamp glasses and wicks for kerosene refrigerators, bulbs for lamps, rings for microstat syringes etc.

## Non-expendible equipment

You receive this equipment from a standard government catalogue. Some items are essential. Check that you have those listed below:

Item	Description	Source	Quantity
Scale	Salter model 235 0 – 25 kg in 1/2 kg graduations	ECHO	1
Tape measure	fibre glass graduated in cms	UNIPAC 0567000	1
Flash light	prefocused 2 cell, plastic right angled	UNIPAC 0630000	1
Auriscope	set electric with spatulae spine battery & bulb	UNIPAC 0660000	1
Applicator	metal ear & nose double ended	UNIPAC 0703000	5
Magnifying glass		local purchase	1
Syringe	ear and ulcer 90 ml conical tip rubber	UNIPAC 0364000	1
Thermometer	clinical rectal 35 – 42°	UNIPAC 0364000	2
Thermometer	clinical oral 35 – 42°	UNIPAC 0481500	2
Pressure Cooker	7 litre aluminium	UNIPAC 2039505	1
*Stove	kerosene, single burner pressure type with prickers	UNIPAC 1070000	1
Lamp	alcohol brass 150 ml	UNIPAC 0855100	1
Syringe	hypodermic 5 ml glass luer or autoclavable plastic	UNIPAC 0784000	5
Syringe	hypodermic 2 ml glass luer or autoclavable plastic	UNIPAC 0783500	30
Syringe	microstat glass 1 ml luer or autoclavable equivalent	UNIPAC 0786500	3
Forceps	tissue 150 mm stainless steel spring type 1 x 2 teeth	UNIPAC 0737000	2
Holder	needle curved Metzenbaum stainless steel	UNIPAC 0742985	1



Scoops	set measure for preparing glucose/salt solution	TALC	1
Measure	1,000 ml with handle stainless steel	UNIPAC 0261000	1
Funnel	lab 75 mm diameter polypropylene	UNIPAC 0945900	1
Bottle	plastic 1,000 ml square	local purchase	3
Stapler		UNIPAC 2680002	1
Cold box	25 litre	SUPDIR Electrolux RCW 25	1
Thermometer	0 – 20°C	WHO	2
Ice packs		SUPDIR Electrolux	1 set
Container with lid		local purchase	4
Syringe	10 ml mixing	UNIPAC 0784500	4
Needles	18 gauge mixing	UNIPAC 0749000	4
Vaccine	2 litre	SUPDIR	
Carrier & Ice packs		Polyfoam EPI/PF/1.5	**
Dressing forceps		UNIPAC 0737000	**
Spirit lamp		local purchase	**
Wind shield		UNIPAC 0535500	**
Container of spirit		local purchase	**
Carrying case		local purchase	**
Vaccine vial holder		locally made	**
Plastic cap		local purchase	**
Soap box		local purchase	**
Ampoule file		supplied with vaccine	**

\* This depends on the type of fuel you have

\*\*Quantity depends upon number of outreach clinics

*Based on material from Primary Child Care: Book One. A Manual for Health Workers. By Dr Maurice King. Published by Oxford University Press.*

You can often buy the above items locally. If you cannot, you can buy them from the suppliers listed:

ECHO: 4 West Street, Ewell, Surrey KT17 1UL, United Kingdom  
Telex: 924507 ECHO G.

UNIPAC: UNICEF local representative

SUPDIR: UNICEF local representative

TALC: PO Box 49, St Albans, Herts AL1 4AZ, United Kingdom

From time to time you need to replace equipment. For example, you may need a new sphygmomanometer to replace a broken one. Your records should show that you have one in your health centre. When you receive a new one, your supplying store will record that you have two until you return the broken one. Remember, do not throw away broken or worn out equipment until you are told to by your supplying store.

## Supply periods

You receive supplies, for example, every three months. This is called the supply period. However, this period is different for different types of supplies. For example, you should receive vaccines once per month, because they are very delicate and can easily be spoilt. Items such as stationery, you may receive once every six months. When you decide how often to receive supplies consider the following:

- how easy is it to reach the store which supplies you?
- do you have to go there for other reasons, e.g. to collect pay, make reports or buy food?
- do you have your own transport?

For example, you may have to go to the supplying store each month. If you have transport and it is an easy short journey, you may decide to collect supplies each month. On the other hand you may be far away without transport. You may have to depend on a delivery at longer intervals for most of your supplies. If you have to depend on a bus, you can only collect a very limited amount of supplies at one time.

## Collection and delivery of supplies

Once you decide on the supply period, you need to decide whether you collect your supplies yourself or depend on delivery.

### The advantages of collection are:

- you see the supplying store keeper and discuss what you need with him.
- you can do other business.
- you can meet other health centre managers.
- you can use different types of transport.
- you can find any mistakes at once and correct them.
- you can make sure the supplies are handled correctly.
- security is easier.

### The disadvantages are:

- it uses up a lot of staff time.
- it is often difficult to get transport.
- if the store keeper does not expect you, he may be away.
- it may cost more.



## The advantages of delivery are:

- it often costs less.
- it does not use a lot of staff time.
- it can be combined with the visit of a supervisor.

## The disadvantages are:

- a particular vehicle is needed.
- if the delivery journey is long, the supplies which can be spoilt by heat are at greater risk.
- it may make the supply period too long especially if there is a season when the roads are difficult to use.
- it is often difficult to get another item if the one which you ordered is out of stock.
- security is more difficult.
- you have to make sure that someone is in the store to receive the delivery.

# How to place an order

Now that you have decided how much you need, you can place an order. You probably use a standard order form e.g.:

G. P. & S. 80374.		<b>REQUISITION: MEDICAL SUPPLIES</b>				№ 309475	
Medical Store,  P.O. Box		For Medical Store use only Account No. Issue Voucher No.		Consignee Postal address Forwarding instructions: Rail, RMS, Post, Road, Air (Delete inapplicable)		Fifth copy Requisitionist's date-stamp	
CHARGEABLE TO:				FOR MEDICAL STORE USE ONLY			
ITEM (N.B.— One size only per line. One item only per line.)				Quantity required	Code number	Amended code number	UNIT
Requisitionist's signature and office held Certificate goods as detailed received in good order and condition. Recipient's signature and office stamp		Approved by NOTE On receipt of the consignment please certify the third copy and return without delay.		Date received at Medical Store	Medical Store reference		Date order completed: Checked by: Bin cards posted by: Assembled by:

Reproduced courtesy of Ministry of Health, Zimbabwe

## When you complete an order form remember:

- state exactly what you need and how much you need. If you order from a standardized catalogue, follow exactly the ordering procedure in the catalogue. Make sure you write down the code number for each item.
- list items in order of importance or in the order in the catalogue.  
Your priority items include:
  - those to refill your life saving stocks.
  - those which you use most.
  - those with a short shelf life.
- make sure that all your parts of the form are complete and that you keep a dated copy.
- make sure you can read all the copies.

## How to receive supplies

Make sure that you check the supplies for signs of damage before you accept them. These include:

- damage to the box which you can see
- leakage stains
- the sound of broken glass from inside the box
- tape or cord which have been removed.

When you open the boxes, carefully check the contents against the packing slip and the copy of your original order.

### Before you make a complaint:

- check the loose packing to make sure that you have not missed any little items.
- check the packing slip. Some items you ordered may not have been in stock.
- check the temperature of supplies which are sensitive to heat. They should be between +4/+8°C.

If there are any shortages or damage, report it *at once* with an explanation, such as, under supplied, broken on arrival, etc. You may have a standard form for this.

Vaccines often have a time temperature monitor like the one shown in Annex IV.

If there is any colour on the indicator. Tell your supervisor and the supplying store that the cold storage for transport is not suitable.

If there is no indicator, record the temperature yourself on the delivery note. Make sure that vaccines and other heat sensitive supplies are placed in the refrigerator at once.

As you check your supplies, enter the items into your stock records. Use the packing note serial number as a reference number on the stock records. This is described further in Section 6.

If the drugs have passed their expiry date you should not use them unless your supervisor tells you.



Only accept gifts and samples if you are told to by your supervisor. If you accept them make sure that:

- they are of suitable quality and strength.
- they have not expired.
- the dose is clearly marked
- and you can read the label.

If you have ordered some drugs by mistake, notify the store which supplies you and follow their instructions.

# Section 5

## How to look after supplies

### This section helps you to:

- develop a system for storing supplies so that you can find them easily
- protect your supplies
- recognize drugs that are spoilt

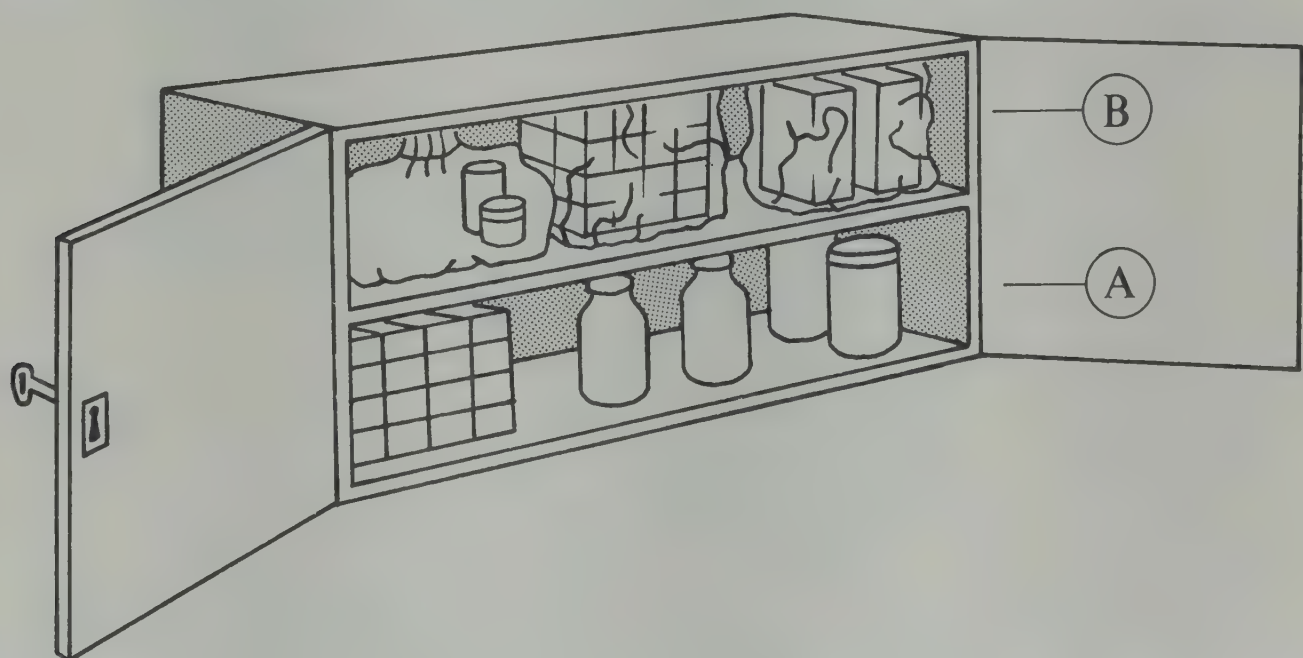
## Developing a system for storing supplies

1. Separate all the dangerous drugs from the other drugs which you have in the store. The dangerous drugs are controlled by special laws. You must store them in a special cupboard with a double lock. If you do not have a special cupboard, use a cupboard inside another cupboard. You should be able to lock both cupboards. You should only have a small quantity of dangerous drugs in a health centre.
2. Separate the life saving drugs. They are marked in Table III, page 23 like this \*\*. You must always have these in stock as someone's life could depend on them. Store them in a cupboard or on a shelf which you can reach easily. Mark the cupboard or shelf clearly, in alphabetical order, with the generic name of the drugs. Do not use maker's trade name. If you are not available 24 hours a day, make sure that a responsible person has the keys after normal working hours, or fit a locked emergency cupboard outside the store.
3. Store the remaining drugs on shelves or in cupboards. Mark the space for each drug with a code, either alphabetically or numerically. Use the same code as the one used by the supplying store. For example, use the order number which the supplying store gives each item as the code. When something is too big to fit on the shelf, put a note in its place to say where you store it.



4. Clearly mark each section of the store so that you can see where to look for supplies. For example, you can divide it into sections for:
  - drugs
  - life saving drugs
  - dressings
  - instruments
  - domestic supplies
  - stationery
  - equipment and spare parts
  - laboratory supplies
  - toxic substances
  - inflammables
5. When you place the stock on the shelves or in the cupboards, arrange the oldest at the front of the shelf and the newest at the back. This is called FIFO which means first in first out.  
It is very important to do this for two reasons:
  - i) The older drug is the more likely to have lost some of its strength.
  - ii) Some drugs like antibiotics have a limited life or “shelf life”. This is usually marked by an expiry date on the bottle and you must not use the drug after that date. This expiry date applies only to the drug in its original state. Once it has been reconstituted keep in the refrigerator and use it within a few days. Reconstituted vaccines must be used for one day only.

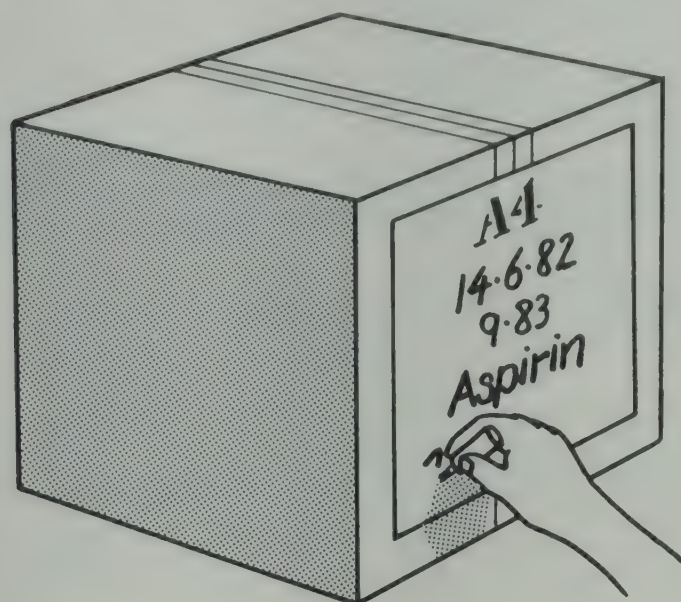
**Two shelf system** If your store is very small use a two shelf system to store your drugs as follows:



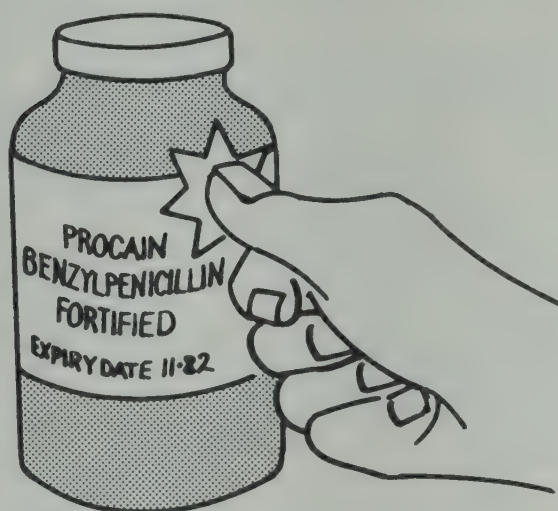
1. When you receive your drugs, divide them into two parts. Put one part on the bottom shelf (A) and seal the other in bags on the top shelf (B).
2. When you use up the bottom shelf (A) send an order for more drugs. Meanwhile start to use the top shelf (B). By the time you finish the top shelf, your new order should arrive.
3. The amount you put on each shelf depends on how long it takes for your new order to arrive. For example, if you receive four months stock and it takes two months to receive your order, then divide the shelves equally. On the other hand, if you have four months stock and it only takes one month to re-supply, then A shelf can have  $\frac{3}{4}$  and B shelf  $\frac{1}{4}$  of your stock.

## Marking drugs

1. Mark all your drugs clearly. If you have containers which have lost their labels, do not use the drugs in them.
2. If you have a large quantity of a particular drug, make sure that the outer carton has the following marked on it:
  - quantity e.g. 20 tins x 500 tablets
  - location code
  - date received
  - expiry date (if applicable)
  - product



3. Check your drugs and mark all those that expire this year. Use them first.



4. You must not keep vaccines for more than a month in a health centre. Page 47 explains what you do with expired supplies.



# Protecting supplies

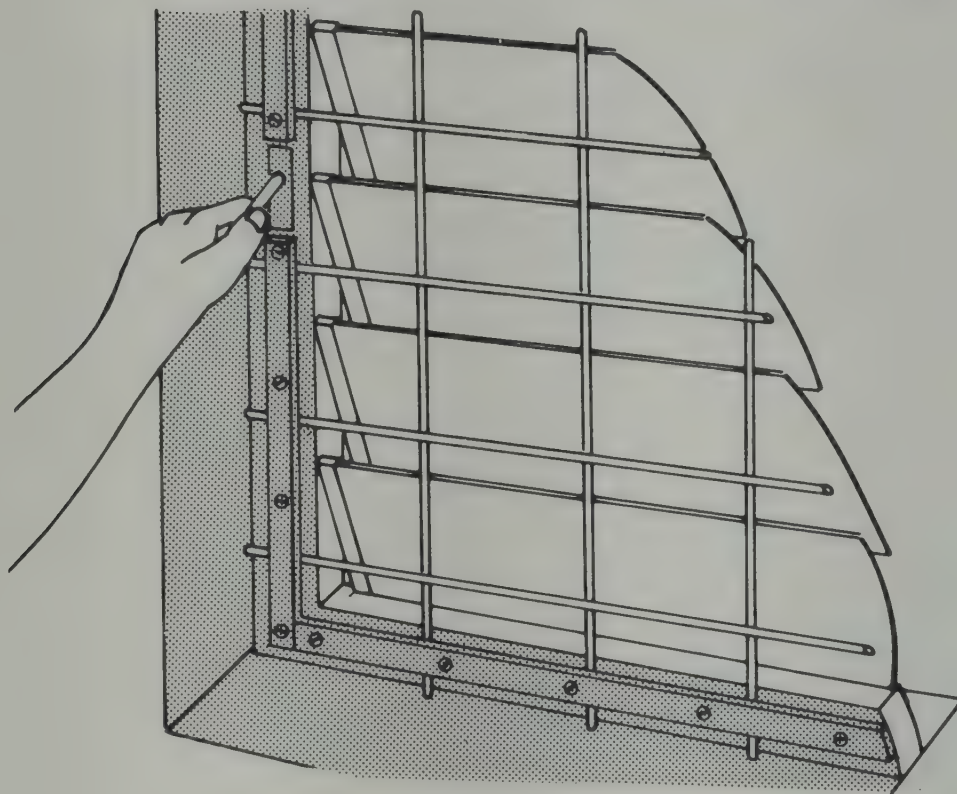
## You need to protect supplies from:

- humidity
- sunlight
- heat
- physical damage
- dirt

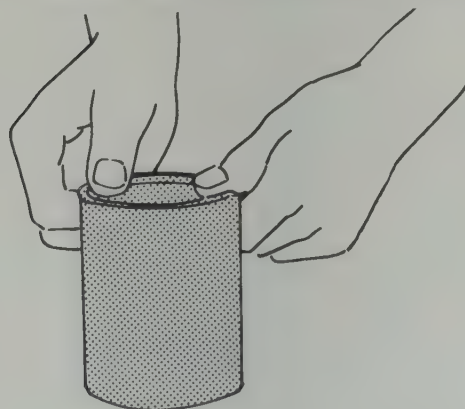
### Humidity

When the air is very damp, it attacks drugs in unsealed containers and spoils them very quickly. It is important to keep this damp air away from your drugs. You can keep humidity down in four ways:

1. Make sure you have good ventilation; keep the windows of your store open.



2. Make sure the lids on the tins of tablets are tight.



3. Use a fan to help the air move. But this needs electricity and some looking after.
4. Use a unit air conditioner. For a store of 20m<sup>2</sup> you need a 3 kw unit. It cools the air by several degrees. However it is very expensive, and depends on an even supply of electricity. You need to look after it.

Remember the hotter it is in the store, the damper the air may be. Keep the store cool.

**Sunlight** The direct rays of the sun spoil some drugs. To protect them against the sun:

- shade the windows, use curtains if they are in direct sunlight.
- keep drugs in cartons.
- do not store or pack them where the sun can shine on them.
- use coloured glass bottles if available.

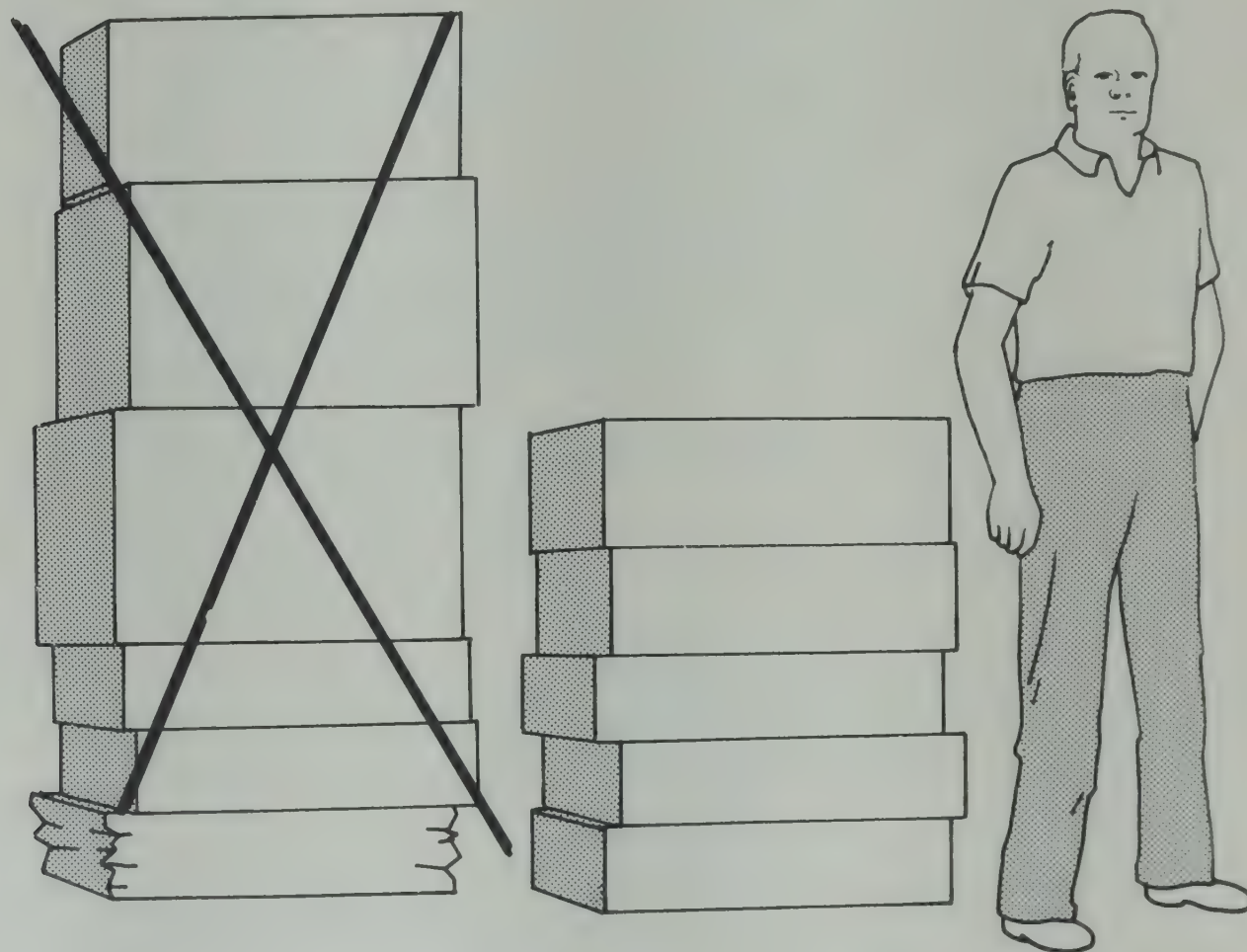
**Heat** Heat affects many of your drugs. It melts ointments, creams, suppositories and pessaries, and makes some drugs useless very quickly. You must protect them from heat. All your supplies keep better if they are cool. Some you must keep in a refrigerator at +4/+8°C. These are:

- vaccines
- sera and blood products
- anti toxin
- insulin
- reconstituted antibiotic injections

Remember **you must not freeze** DPT, DT, TT vaccine or injectable contraceptives. If you do you will spoil them (see Annex III).

**Physical damage** You can damage supplies physically. For example you can easily crush tablets and ampoules. You can avoid physical damage in the following ways:

1. Do not make tall piles of large items like ORS. This increases the risk of crushing. It also makes it difficult to reach the supplies at the top of the stack.



2. Sharp edges and corners may damage cartons. Make sure there are no sharp edges and corners in the store by binding them with tape.



**Dirt** If your store is dirty it encourages pests which may damage the supplies. Dirt also makes labels difficult to read. Make sure you clean the store at least once a week.



To clean the store, dampen the floor or scatter wet tea leaves before sweeping. Use a damp cloth to wipe walls and shelves. If possible use a vacuum cleaner.

## Security

The supplies in your health centre are valuable. Some of them are dangerous if you misuse them. To keep the store secure:

1. Make one person responsible for looking after all supplies. Appoint someone to be in charge when this person is absent.
2. Keep the store locked. Two people should be responsible for keeping the keys.
3. Make sure that the security measures described on page 3 are in working order.
4. Make sure you carry out checks as described on page 47.
5. Make arrangements for out of hours emergency service. See page 36.

## Loss or theft

**Loss** If you find that items are missing from your store you should take the following steps:

1. Check the stock:
  - recheck the stock entries to make sure there are no errors on paper.
  - make sure the item is not in a different part of the store.
2. Report to your supervisor in writing:
  - when you noticed the loss (time and date).
  - any possible reasons for the loss.
3. Arrange for another supply of the missing item if necessary.

## Theft

- If there has been a break into the store, tell your supervisor and the police at once.
1. Place essential drugs and vaccines in safe storage. If vaccines have been in high temperatures, do not use them unless your supervisor tells you.
  2. Touch nothing else until the police have completed their investigations.
  3. Check to see what has been stolen.
  4. If you have a night watchmen make sure he is present to answer questions.
  5. Check where all the staff are.
  6. When the police have finished, clear up and make the store secure. Then re-order the stolen items.
  7. Write a report to your supervisor stating:
    - what has been stolen. Give the value if possible.
    - include a police report if you have one. Otherwise give a description of the break in.
    - steps which you have taken to secure the store.
    - any remaining shortage which you cannot replace.

## Recognizing drugs and supplies that are spoilt

No matter how careful you are, you may find that some of your supplies are spoilt. It is often impossible to tell if supplies are spoilt but here are a few tips to help you.

- Smell:** When some items such as aspirin have been attacked by too much heat and damp, they smell. If a tin smells when you first open it, the aspirin are useless.
- Colour:** Some drugs lose their colour when they are spoilt. Make sure you know what colour a tablet should be. If it is a different colour or colours, do not use it.
- Breaking up:** When tablets are damp they break up. You must not use them.
- Drying out:** Condoms are normally lubricated. If they have dried out you should not use them.
- Melting:** Oral rehydration salts (ORS) may melt above 30°C. If you find ORS packets which are dark brown and sticky and will not dissolve, do not use them. Capsules may also melt with heat. If you find capsules are stuck together do not use them. If suppositories, pessaries, creams and ointments have melted and become runny, do not use them.
- Clarity:** Use the test shown in Annex III to see if DPT, DT and TT have been damaged by freezing. In Annex I there is a list of drugs some of which show signs when damaged.



# Section 6

## How to organize supplies

This section explains how to:

- keep stock cards/ledger and special registers
- avoid running out of supplies
- stock take and building check
- check use
- get rid of expired drugs
- re-order

## Stock control

**Stock cards** This is the simplest method of recording the movement of supplies. An example is shown below.

STOCK CARD						
Location				Re-order level	Maximum stock	
A.5		Description ASPIRIN (acelylsalicylic acid) 300 mg		5,000	17,000	
UNITS Tablet						
Date	Received from	Issued to	Delivery/ Order Note No.	Quantity	Balance in stock	Check
Carried forward					2,000	
6-1-82	Dist. Store		123	15,000	17,000	
7-1-82		Out patients	345	1,000	16,000	
10-1-82		Dispensary A	346	3,000	13,000	
12-1-82		MCH	347	2,000	11,000	O.K.
7-2-82		Out patients	348	1,000	10,000	
14-2-82		MCH	349	2,000	8,000	
16-2-82		Dispensary A	350	3,000	5,000	5,000 OK

## The card shows:

**Location code:** this tells you where to find the item in the store. For large items which you store in separate places, show both the places.

**Description:** use the same description as the supplying store. Each item has its own card. For example, aspirin for children will be on a different card from adult aspirin.

**Units:** this shows the unit measure used for the item, e.g. tablets, 10 dose vials, capsules, 250 ml bottles, etc.

**Re-order level:** this shows the minimum quantity at which to place your order for more stock, see page 46. You should have the minimum quantities shown in the tables when you receive your supplies.

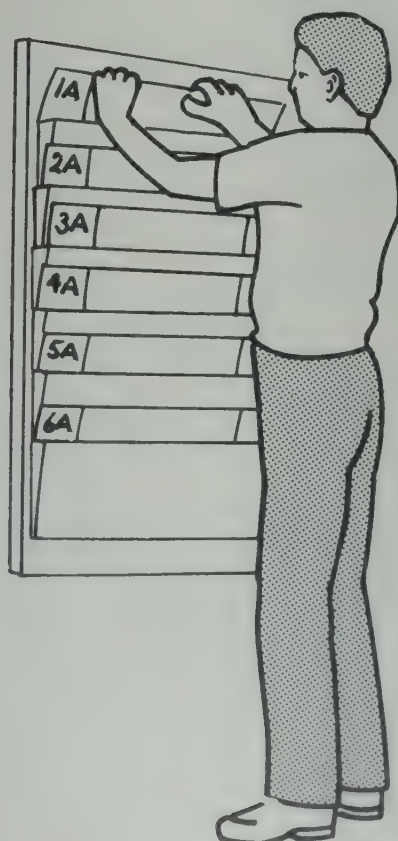
**Maximum stock:** this shows the maximum amount you should have in the store. To meet your needs and avoid keeping stock too long before you can use it, see page 46.

For each receipt or issue record the following:

- date
- received from/
- issued to
- delivery or order number (see Section 7)
- quantity received or issued
- balance in stock
- check

The last column allows you to record your findings when you check the stock. You should check the stock regularly.

Store these cards together in a box or keep them together on a board.



Pin a polythene bag to the board for each card. You can keep the board in a suitable place near the entrance to the store. Or you can keep the cards with the stock in the correct place on the shelves.



## Inventory

You can record some items, especially equipment, better in an inventory. This is a book which has one page for each item. These pages are divided up like the stock card with two extra columns.

Re-order level 5 Maximum stock 10		Location S2	Units each	Description stethoscope standard		Page No. 30.	
Date	Received from	Issued to	Invoice No.	Quantity	Sig. of resp. person	location	balance check
1-4-82	District store		128	4		Store	4
1-5-82		OPD		2		Treatment	2
1-6-82		Mobile 1		1		Mobile 1	1

Use these only for equipment.

Signature of responsible officer. This is where a person signs that he has taken charge of the item.

Location: this records where you normally keep the item so that you may carry out a physical check at a later date.

## Special registers

Record dangerous drugs in their own register. You should sign this each time you issue or receive one of these drugs. Keep this register in the locked cupboard with the drugs.

## Avoid running out of supplies

It may be very difficult to keep up your supplies, especially if there are shortages. However, there are steps that you can take to avoid running out of supplies.

To make sure that you have some supplies you must keep a reserve stock.

### Reserve stock

1. You probably find that during the year demand changes at certain times, for example, during:
  - the dry/wet season
  - harvest/planting
  - religious festivals

These are expected and you can plan for them. However there are events which you cannot plan for, such as:

- a breakdown of the supply vehicle
- epidemics
- change of prescribing policy
- shortage of supplies
- natural disasters

For these unexpected events you need a reserve stock.

2. The reserve stock should be equal to a quarter of the stock which you use during a supply period. For example if you use 24,000 aspirins during the supply period your reserve should be  $24,000 \div 4 = 6,000$ .
3. When you receive new stock make sure that you use the old reserve first. Also put some of the new stock aside as reserve.

### **Re-order level**

To make sure that your new supplies arrive before you run out you must know when to re-order. This is called “re-order level”.

1. You need to re-order your supplies before you reach your reserve stock. Otherwise if there is an unexpected delay you may run out. To find this re-order level check how long it takes to receive new supplies. For example, it may take two weeks from the time you write the order to the time you receive the supplies.
2. Work out how much you use during this period.
3. Add this to the amount in the reserve stock. This gives the re-order level. For example: if you use 8,000 aspirin a month and it takes two weeks to receive your order, you need to add 4,000 to your reserve stock. Then the re-order level is: reserve stock 6,000 + 4,000 = 10,000.
4. You can also mark the re-order point with a line drawn on the shelves. Or you can place a card in a stack at the re-order point.

### **Maximum stock**

Your supplies must not reach their expiry date before you can use them. The supplying store also has to distribute its stock fairly. You must have a maximum stock level.

A maximum stock level stops you over-ordering supplies. Take the average monthly amount of supplies used. Multiply this number by the number of months in the supply period. This gives you the maximum amount used. For example, if you use 8,000 aspirin a month, for three months you need  $8,000 \times 3 = 24,000$ . You need to add an allowance for wastage, say 10%, see page 20. You also need to add the amount in your reserve see page 20 e.g.  $24,000 + 2,400 + 6,000 = 32,400$ , so 33,000 is your maximum stock.

### **Rationing supplies**

If there are unavoidable shortages you may have to ration the use of supplies, especially drugs. Then you have to make choices. You may base these on the following:

- age – e.g. only treat people below a certain age
- response to treatment – e.g. serious cases only
- possibility of recurrence – e.g. a patient’s work may make the disease come back again.

It is very difficult to make these choices. But if you are short of supplies make the best possible use of them. Remember even if you do not make these choices, you still select the patients you treat. It will be first come first treated. This may not be the best use of your supplies.



## **Use another drug**

If you are going to run out of a particular drug, check your supplies. See if there is another drug which you can use instead. Then use the drug in short supply for essential cases and use the substitute for routine cases.

# **Check use of supplies**

You need to check the use of supplies for several reasons:

1. You may find that you do not use some items. Find out why and if necessary return them to the supplying store.
2. You must make sure that you do not waste consumable items.
3. You must make sure that you keep items like sterilizers, refrigerators or vehicles, in good condition. They can break down easily.
4. You must make sure that you look after other items like furniture.

Make a timetable for checking the use of all the supplies in your health centre. Some need checking once a year. These include furniture, soft furnishings. Check those which can break down easily each month. Check other items at least three times a year.

# **Disposal of expired drugs and supplies**

You have to dispose of some items, for example worn out needles and syringes and part used vials of vaccine. The best way is to burn them in an old oil drum with holes in it. Then bury what remains.

Before you burn items, open jars, ampoules and vials. Otherwise they may explode. If you cannot burn them bury expired drugs in a hole in the ground at least 40 cms deep. Do not throw expired drugs away inside their wrappings.

You can pour non-corrosive liquids down the drain if the drain goes into a septic tank. After you have disposed of expired drugs, pour lots of water into the drain to clean it. Then wash your hands.

You may have to return some expired items e.g. drugs and vaccines, to the supplying store. In this case, clearly mark them 'Expired supplies' before you return them. When you have to dispose of items mark the details in your records.

# Stock taking and building check

You must check your stock regularly. This means that you count what you have on the shelves and compare it with the record. If you find a difference, find out the cause. You should carry out this stock check at least three times a year and, if necessary, more often and at no fixed time.

You must keep your store in good condition. Check:

Inside		Yes	No
Windows	frames in good condition glass unbroken glass clean mosquito mesh unbroken security mesh unbroken		
Doors	frame in good condition door in good condition hinges in good condition lock in good condition		
Ventilators	security mesh unbroken		
Ceiling	flat (no sinking in the middle)		
Walls	clean paint in good condition		
Floor	clean smooth and unbroken		
Shelves	undamaged flat (no sinking in the middle) shelf marking clear		
Cupboard	undamaged locked		
Refrigerator	follow checks in <i>How to look after a refrigerator</i>		
Pests	free from vermin winged insects termites		
Services	lights are working power outlets are working water supply good kerosene/gas supply good		
Outside			
Roof	in good condition		
Walls	in good condition		
Verandah	in good condition		
Surrounding area	clear of long grass and rubbish dust		



# Re-ordering supplies

There are several ways to re-order your supplies. They include:

**Fixed quantities** You may order the same amount each time.

## Advantages

- it is very simple
- it saves staff time
- it makes the job of the supplying store easier
- it does not depend on the supplying store receiving an order

## Disadvantages

- you may have too much or too little at certain times of the year
- you may not have enough to meet unexpected demand
- you may always order too much

**Semi-fixed ('top up') quantities**

This system is very useful for outreach workers who normally receive supplies from health centres.

It works as follows:

These workers have a box with fixed spaces for each item. When they re-order they check the box spaces and order enough to refill it.

## Advantages

- simple
- quick
- easy for supplying store

## Disadvantages

- not all workers need the same quantities or types of supplies
- difficult to check
- limited to a small scale

**Variable quantities**

This system allows you to make allowances for seasonal differences in demand and to change your supplies to meet your particular requirements.

## Advantages

- it varies to meet demand
- it is cheap

## Disadvantages

- it takes time to prepare
- it depends on the requesting store to complete an order

If you have to keep your supplies cool, remember to send a cold box with ice packs with your order.

# Section 7

## How to issue supplies

### This section explains about:

- issuing supplies
- how to pack supplies
- organizing a dispensary
- dispensing drugs

### Issuing supplies

**Equipment** Some items of equipment are kept in different parts of the health centre. For example, the glass slides, a microscope, centrifuge and laboratory supplies are in the laboratory. These are the responsibility of the laboratory technician. In the maternity clinic the nurse is responsible for baby scales and delivery kits.

When you issue these items to the responsible staff keep a record in your inventory ledger in the store. This is described in Section 6 page 45.

**Consumables and domestic items** Issue these items by using an issue voucher. This form records:

- the date of issue
- item which you issue
- how much you issue
- which part of the health centre uses it
- who is responsible for its use and their signature.

Keep one copy of this voucher in the store. Return the other copy to the person who collects the supplies. It is a good idea to have set times for issuing supplies. If you have a large centre, with several departments, you may need to make a timetable. This shows each department when they can collect supplies. For smaller centres you may issue supplies at a set time each day.



## Drugs

Drugs which you supply from the store go in large quantities to the dispensary. The dispensary then supplies the other parts of the health centre.

If you are supplying another centre such as an aid post or clinic, you probably issue their drugs from the store.

When you issue supplies make sure that:

- for items with an expiry date you issue them in date order. They must not reach their expiry date, before the next supply period.
- you note those items that have reached their re-order level and re-order them.
- the caps of any bottles or tubes of ointment which you issue are tight.
- the supplies are in good condition
- those items which need protection such as vaccines are collected in a suitable cold box with ice packs. If indicators are included, check that they are correctly filled in.
- items of equipment are working
- all the spares which you supply are suitable for the equipment for which they are requested.
- you fill in the issue voucher correctly, and you record the number on the stock card.
- you supply all the items requested or give an explanation for their absence.
- before issuing supplies you answer any queries about the order.
- you supply the correct items.

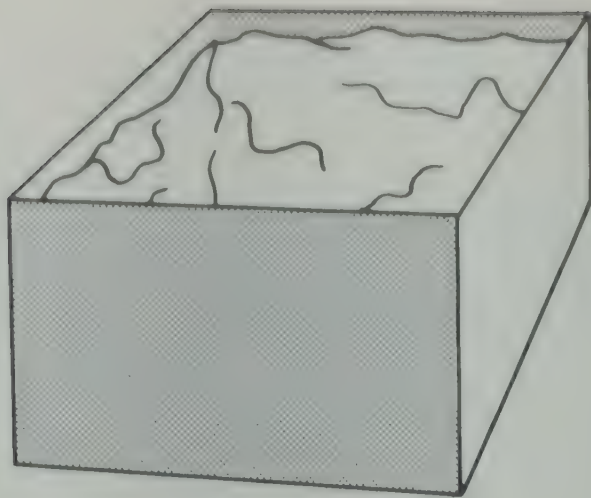
## How to pack supplies

The packing of supplies is most important. Badly packed items may break. Heat can spoil badly packed vaccines and sera.

*How to look after a refrigerator* (see Annex V) tells you how to pack a cold box and vaccine carrier.

To pack other supplies, you need the following materials:

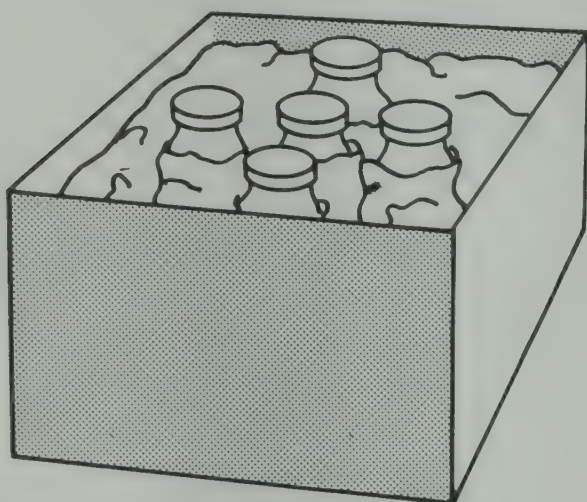
- wooden or cardboard box approximately 60 x 60 x 60 cm
- plastic bags
- adhesive tape
- cord
- scissors
- glue
- packing material.



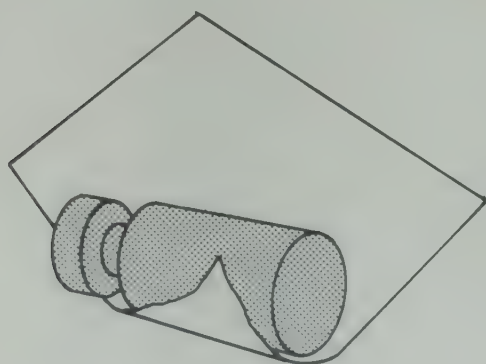
1.  
Line the box with packing material.



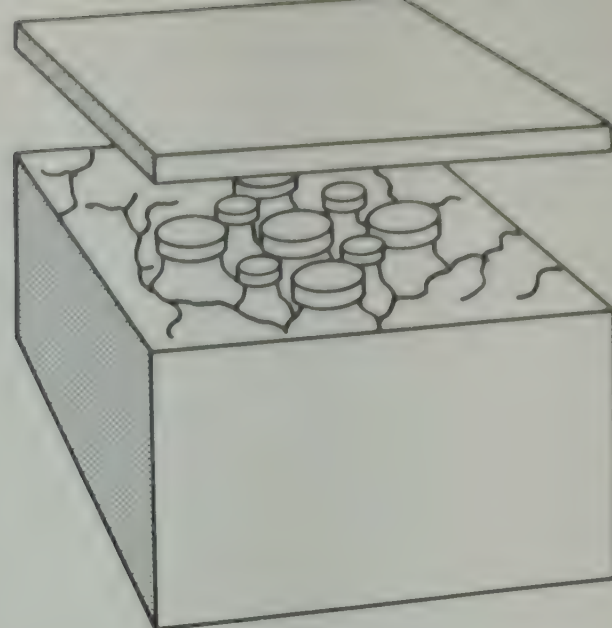
2.  
Wrap the large bottles in paper.



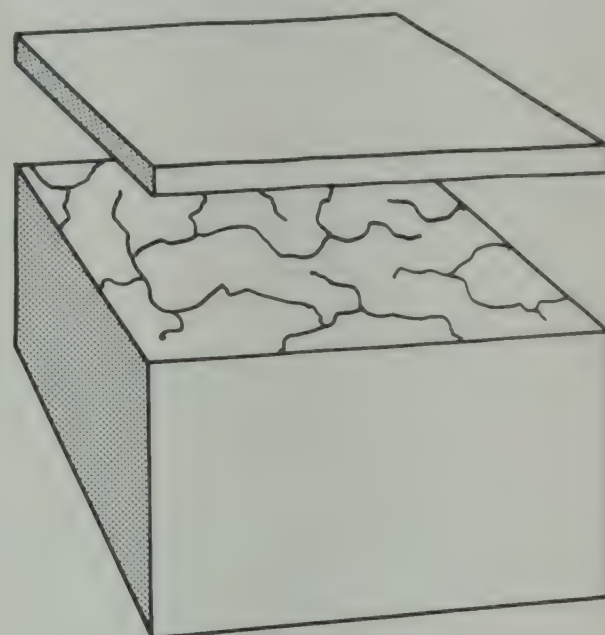
3.  
Place the large bottles in the centre of the box.



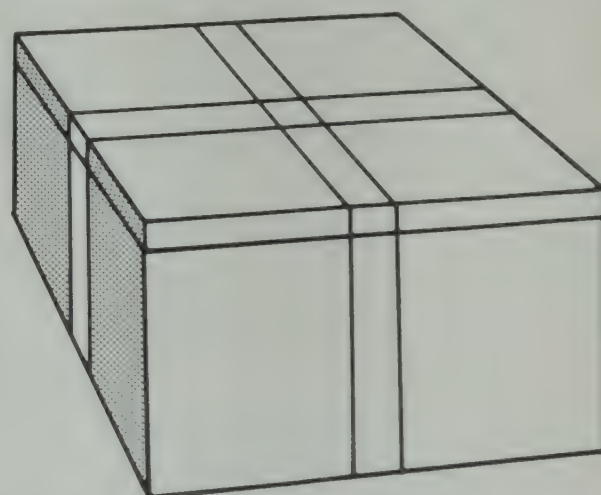
4.  
Wrap small items in paper and put them into the gaps.



5.  
Fill plastic bags with paper you have cut up or clean straw. Put bottles and other small breakables in them and put these into the remaining gaps.



6.  
Fill the remaining gaps with paper. Put paper on top and put on the lid.



7.  
Seal the box with tape and cord. Make sure that you label it clearly with the address and name of the person who is to receive it. When necessary use labels such as "Glass", "Urgent Medical Supplies", "Inflammable Chemicals" etc.



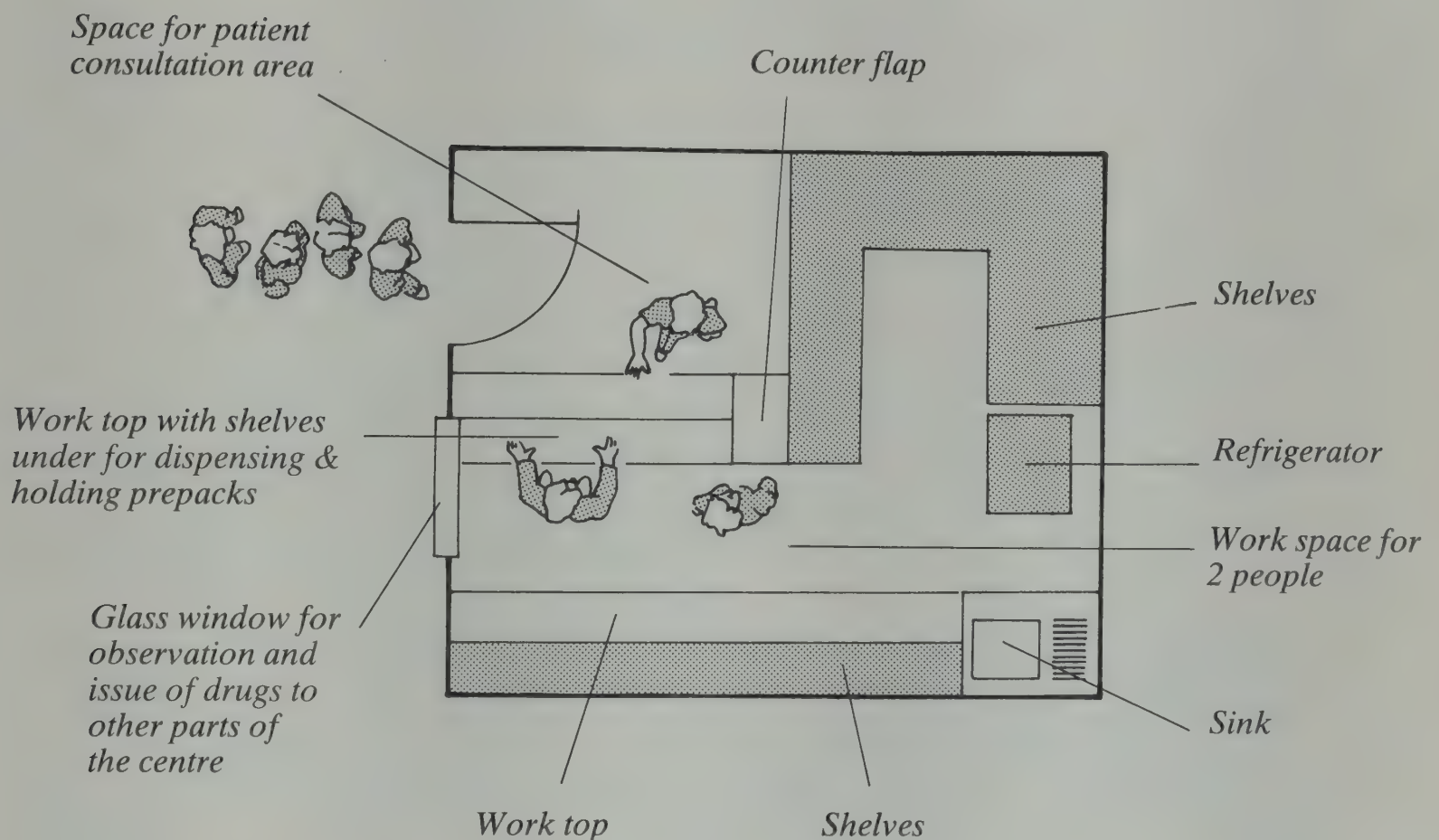
# Organizing a dispensary

**Layout** Your dispensary serves large numbers of out-patients and the other parts of the health centre. So make sure that you organize it well.

Arrange the dispensary so that you have space for:

- the drugs to be stored
- the pharmacist to work
- pre-packing the drugs which you use the most
- the patients to collect their drugs and be told how to use them
- other patients to wait.

The following diagram shows a dispensary layout.



## Dispensing drugs

### Reading prescriptions

Make sure you understand the instructions written on the prescription. If you cannot read it or do not understand it, check with the person who wrote it out. Then prepare the prescription for the patient.

### Preparation of drugs

Dispensaries are very busy during a clinic and many patients come to collect drugs. The pharmacist must make sure that he gives the correct drug to the patient. He must also make sure that the patient knows how to use it. The following helps him do this.

## Pre-packing tablets

Many patients need similar quantities of the same drug e.g. folic acid, chloroquine, aspirin, etc. Pre-pack these drugs before the clinic so that you do not waste time counting tablets when the clinic is busy.

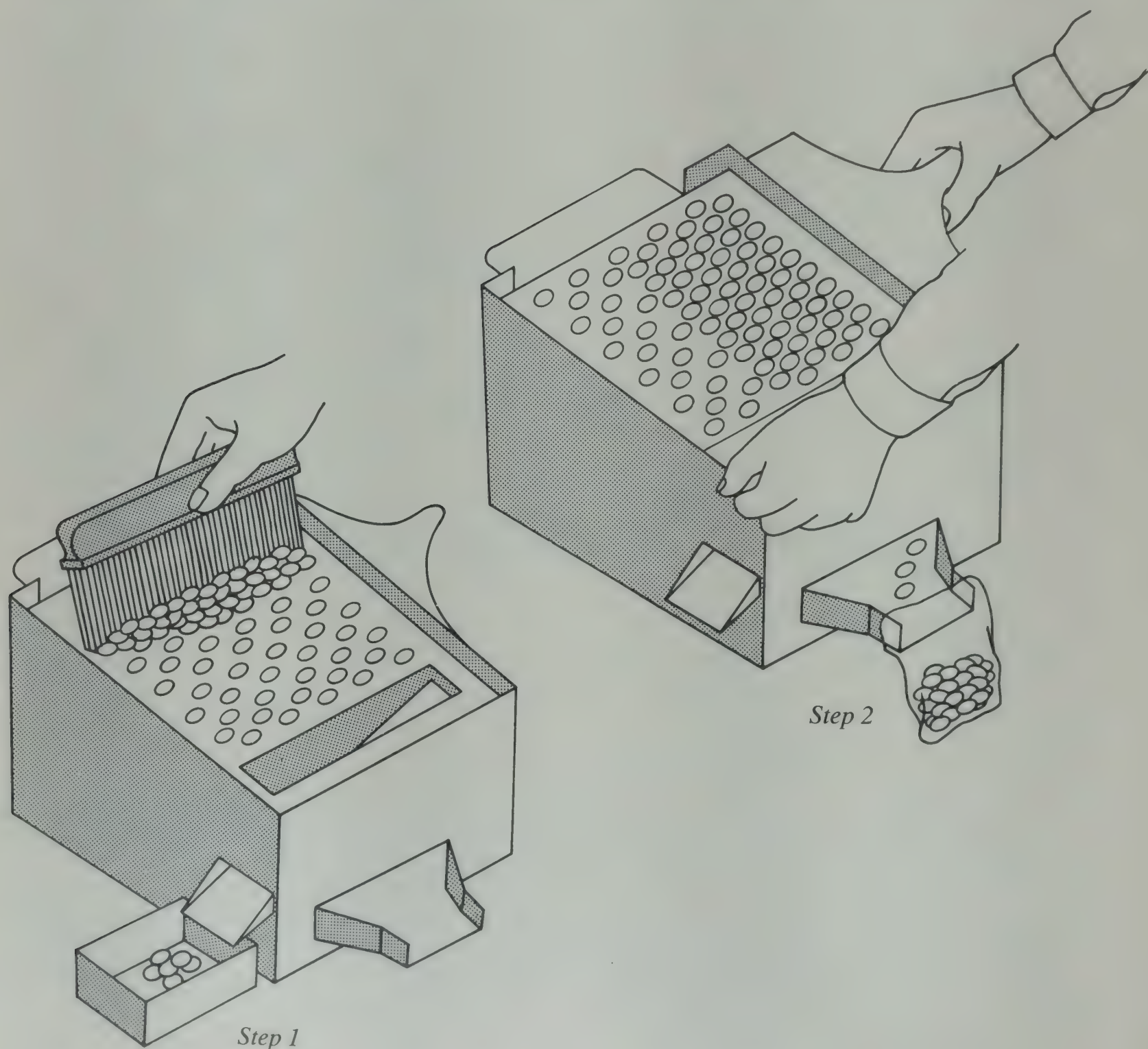
To do this you need:

- a tablet counter
- paper bags or polythene
- a heat sealer/stapler
- labels

Decide how many packets to prepare each day. To do this, check the dispensing records for each drug and see what the average is for a day. It is better to pre-pack too few than too many. If you have too many it may be difficult to arrange to use the oldest first. Also you can only keep drugs in these packages for a limited time.

## Tablet counting

Simple tablet counters are shown below. The detailed drawings are shown in Annex IV.





● **Method of operation**

- (i) With the counter there are different boards with holes to suit various tablet sizes. Each board has 100 holes arranged in rows. The operator selects a suitable board and puts it in the counter, on top of a removable plate which stops the tablets falling through.
- (ii) The operator shakes the tablets onto the board. They are swept across it to fill all the holes. Any excess tablets fall down a chute into a box.
- (iii) The operator now pulls out the removable plate row by row. This releases the required number of tablets, which drop into a bag.

**Advantages**

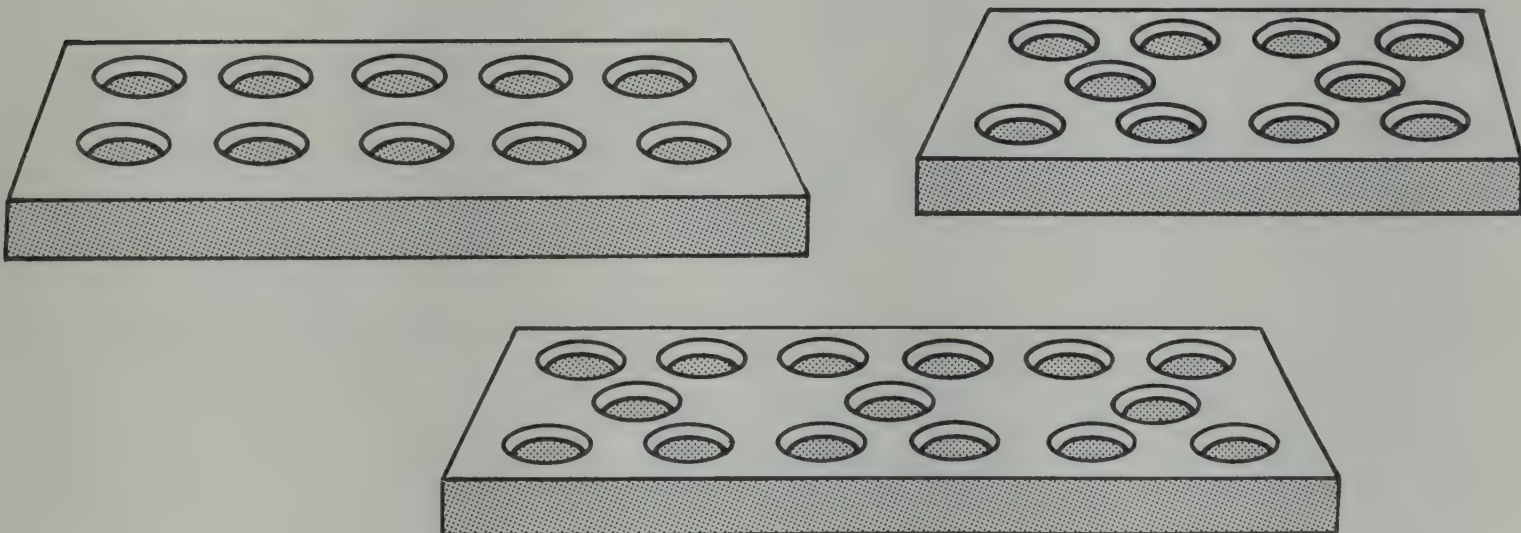
- it is simple to use
- you vary it for different sizes
- you can vary it easily for different quantities
- it reduces the risk of tablets getting dirty
- it is easy to fill bags

**Disadvantages**

- it is difficult to make
- it is more expensive to buy

With a counter like this you can easily pre-pack pills in quantities from 5 – 100.

2. Another alternative is to drill blocks of wood with a number of holes of suitable size.



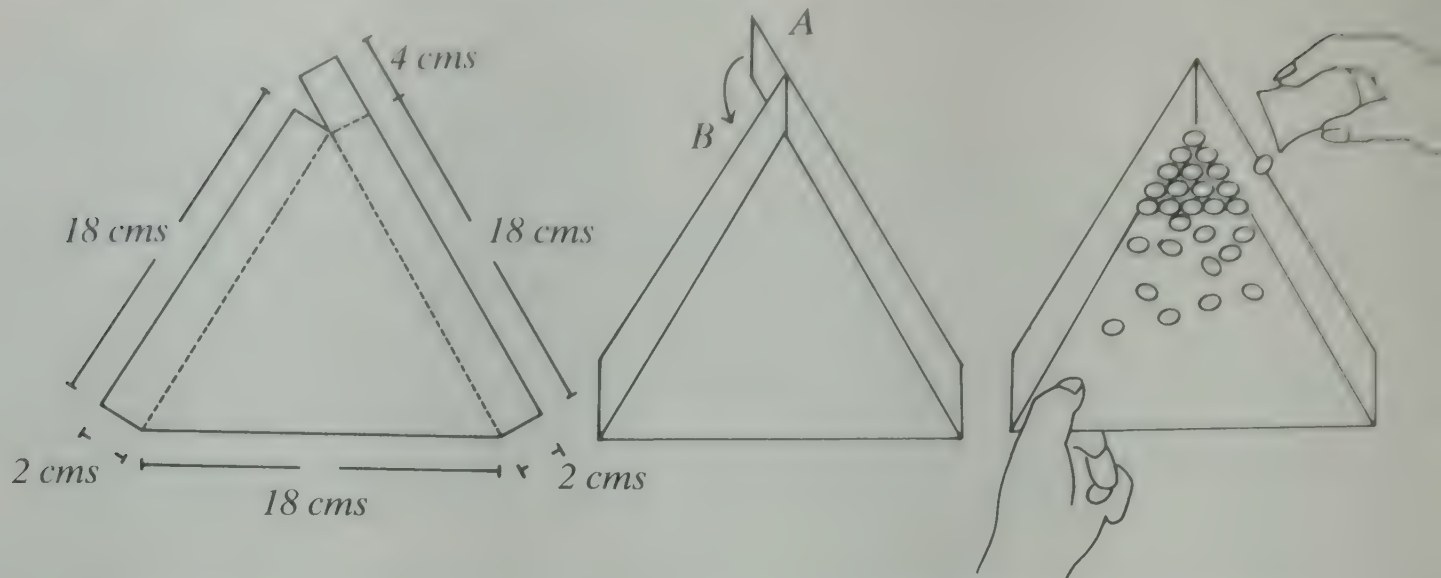
**Advantages**

- it is very cheap
- it is very easy to make
- it is easy to use

**Disadvantages**

- it requires a different block for each size and quantity
- the tablets are not contained
- the tablets are likely to get dirty
- it is possible to spread contamination from one type of tablet to another.
- it is difficult to fill bags

3. A third type is a tablet counting triangle which is made like this.



Take a piece of stiff shining card and cut out a triangle using the pattern above. Fold along the dotted lines and fix A to B.

Use the following table to work out the number of tablets

<i>Rows</i>	<i>Number of tablets</i>
1	1
2	3
3	6
4	10
5	15
6	21
7	28
8	36
9	45
10	55
11	66
12	78
13	91
14	105
15	120
16	136
17	153
18	171
19	190
20	210

To use the counter, fill the number of rows nearest to the total required, then add or take away the balance. For example if you need 20 tablets, fill to row 6 and subtract 1.

#### Advantages

- it is very easy to make
- it is very cheap
- it fits any size of tablet

#### Disadvantages

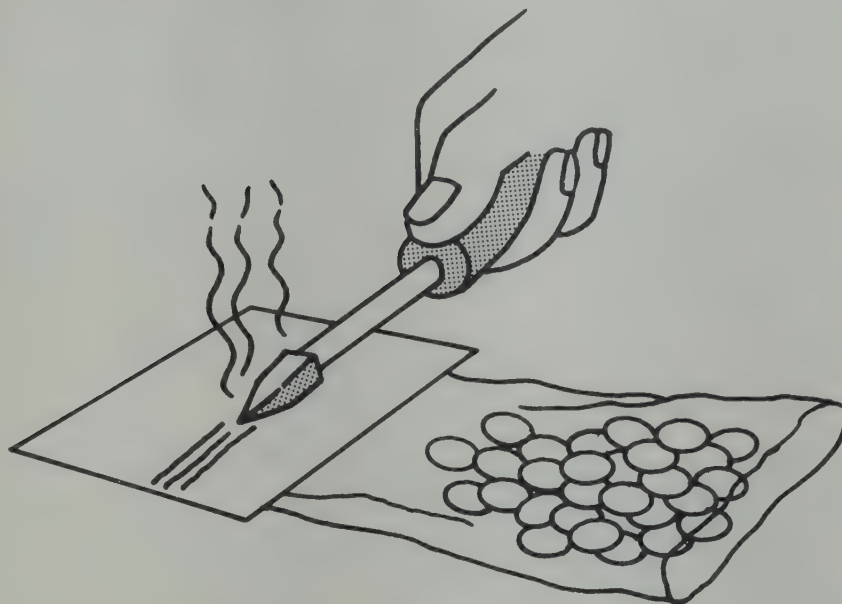
- it is more complicated to use
- it doesn't last long
- the tablets are not contained
- bag filling is a separate operation

Whichever you choose these tablet counters are much easier and quicker than counting by hand.



## Sealing packets

Fill polythene bags with the doses of tablets and seal. For this use a heat sealer. If you do not have one use a soldering iron with a piece of silver foil, as shown in the diagram. If you do not use the silver foil, the polythene melts and does not seal. Another alternative is to use a stapler but this does not make an air tight seal. If you cannot get polythene use paper packets. Paper is easier to reseal, but does not keep out the moisture.



Remember neither paper nor polythene keeps air out completely. So you should not keep the tablets in these packets for more than a week.

## Pre-filling solutions

When you have solutions in bulk you can pre-fill to save time. When you pre-fill make sure the bottles are labelled. This is particularly important if you have solutions of different strengths. You should dilute them enough so that the dose avoids half measures.

If you have difficulty in getting bottles, try to build up a small stock. So when patients bring their own bottles you can exchange them for ones which you have cleaned. Remember, do NOT fill a bottle which a patient brings in until you have cleaned it properly.

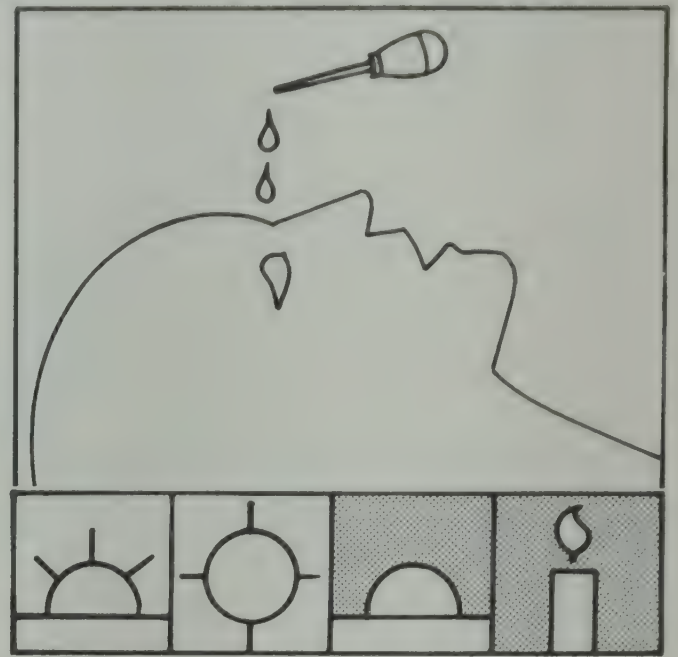
## Labelling

Each prescription must include a label which shows:

- how many times a day a patient should take or use a drug
- how much a patient should take
- how a patient should take it or use it

Stick the label on to the prescription and tape it. The sticky tape helps protect the writing from getting dirty. If you use clear packets for packing, you can put labels inside the packet.

The label should always have the name of the drug and the strength. As many people cannot read it is a good idea to use pictures to show the information. How you show the information will vary. Some examples are shown here.



<b>Name</b> <b>Medicine</b> <b>For</b> <b>Date</b> <b>Dosage</b>			

**Take 2 tablets**  
**4 × per day**


*Reproduced courtesy of Jeremy Bratt and the World Health Organization.*

You need to make your own labels and test them to see which people understand easily.



## Dispensing

When you are dispensing drugs make sure that the patient understands the dose and how often he or she has to take it.

Keep a list of people working in your centre who can help with difficult languages and dialects.

You will see from the layout of the dispensary that only one person comes to the counter at a time. This gives you the time to explain to the patient how to take the drug and to make sure that he understands.

In the dispensary keep all the drugs away from the counter so that patients cannot reach them. A good arrangement for those drugs you have pre-packed is to put them in pigeon holes in the counter like this:








Make sure that the patient can see the working area for the pharmacist but not reach it.

Arrange for the other departments in the health centre to collect their drugs at a different time from the main rush of out-patient time. You can supply their drugs in a single container which you can prepare when your work is quiet.

It is a good idea to issue only diluted disinfectants from the stores. Domestic staff normally put too much disinfectant in their cleaning water. This not only wastes disinfectant, it often stops it from working properly.

If people who are working in the dispensary cannot read you may use symbols to represent the commonest drugs used, for example:

	=	Aspirin
	=	Chloroquine
	=	Penicillin
	=	Tetracycline
	=	Piperazine

The number of times these appear on the prescription shows how many tablets should be taken a day.



# Annex I

## Properties and storage of some dangerous chemicals and drugs

### Key

- A<sup>1</sup>** Flammable: store in a metal box at ground level, preferably in an outside store.
- A<sup>2</sup>** Highly flammable: store in a metal box at ground level, in a well-ventilated fire-proof outside store.
- B** Corrosive: store at low level. When you open the container, place a heavy cloth over the neck and stopper.
- C** Toxic (poisonous): store in a safe place preferably in a locked cupboard.
- D** Injurious or irritating vapour: store in a bottle with a tight stopper in a safe place.
- E** Harmful: store in a safe place, not on an open shelf.
- F** Oxidizing: store away from organic material, reducing agents, and flammable chemicals.
- G** Explosive
- H** Deliquescent (dissolves in water from the air): store in a bottle with a tight stopper.
- I** Volatile (vapourizes rapidly): store in a bottle with a tight stopper.

Chemical	Properties and storage
Acetic acid, glacial	A <sup>1</sup> , B, D
Acetone	A <sup>2</sup> , D, I. Do not allow this to come into contact with chromic acid as this can cause a violent chemical reaction.
Ammonia solution	B, D, I
Barium chloride	C
Chloroform	C. This forms toxic carbonyl chloride on exposure to light. Always store in a dark bottle. Chloroform vapour is anaesthetic.
2,4-Dinitrophenylhydrazine	C
Diphenylamine	C, D
Ethanol, absolute	A <sup>2</sup> , E, I. Hygroscopic
Ethanolamine	B, D
Ether, diethyl	A <sup>2</sup> , I. They may form explosive peroxides when exposed to light. Always store in a dark bottle. Use in a well-ventilated laboratory. Ether vapour is anaesthetic.
Formaldehyde solution	C, D
Hydrochloric acid, concentrated	B, D. Violent chemical reaction can occur if it comes in contact with chromic acid.
Hydrogen peroxide solution	B, F. Store in a dark polythene bottle in a cool place. Decomposes in light and warmth.
Iodine	E, I. Store in a dark bottle
Mercury	C, D, I. It attacks lead piping and soldered joints.

Chemical	Properties and storage
Mercury II chloride	B, C
Mercury II nitrate	C
Methanol, absolute	A <sup>2</sup> , C, D, I. Hygroscopic.
Nitric acid, concentrated	B, D, F. Store in a dark bottle with a tight stopper. It is a fire risk when it comes into contact with combustible materials.
Phenol (carbolic acid)	B, C. Hygroscopic. Oxidizes and turns pink on exposure to light. Store in a dark bottle.
o-Phosphoric acid	B, E
Picric acid (solid)	A <sup>1</sup> , C, D. Explosive when dry, therefore make sure the chemical is always covered with water.
Potassium cyanide	C. Highly toxic when you breathe it, swallow it, or it comes in contact with skin. Wear mask and protective gloves when you handle it. Always store in a locked cupboard. It develops highly toxic gas upon contact with acid.
Potassium dichromate	E. It irritates eyes, respiratory organs and skin.
Potassium hydroxide	B, H
Potassium oxalate	C
Silver nitrate	B, F. Store always in a dark bottle.
Sodium azide	C. Highly toxic when you swallow it. Develops highly toxic gas upon contact with acid.
Sodium hydroxide	B, H
Sodium nitro-prusside	C
Sulphanilic acid	E
Sulphuric acid	B, H. Hygroscopic, <i>never</i> add water to the acid when diluting. Always add the acid to the water.
Thiozemicarbazide	C
Toluene	A <sup>2</sup> , D
o-Toluidine solution	A <sup>1</sup> , C
Trichloroacetic acid	B, D, H
Xylene	A <sup>2</sup> , D, I



Storage recommendations and stability characteristics of 33 selected drugs from the WHO model list of essential drugs

Essential drugs	Storage temperature	Maximum storage time	Protect from	Indicators		Comments
				Good	Perished	
Acetylsalicylic acid tablets (aspirin)	up to 30°C	expiry date	light moisture heat >40°	white tablet	Acetic Acid odour	very stable
Aluminium hydroxide tablets	≤25°	"	air moisture heat			once reconstituted refrigerate
Ampicillin powder for oral suspension	≤25°	"	air light moisture heat			stable
Benzoic acid and Salicylic ointment	<30°	"	heat			
Benzyl benzoate lotion		"	air light heat			
Benzylpenicillin	≤30°	"	heat			very stable
Chloroquine hydrochloride tablets	<37°	"	air light			very stable at up to 37° and 80% humidity
Chlorpromazine gluconate injection		"	light		brown or violet colour	
Chlorhexidine		"	heat light			
Dapsone tablets		"	light moisture		discoloration by light <i>without</i> decomposition	
Diazepam injection		"	light			
Epinephrine (adrenaline) injection	upto 25°C	"	air light		red colour	darkens on exposure to air and light with loss of potency
Ephedrine sulfate or hydrochloride tablets		"	light moisture			

Essential drugs	Storage temperature	Maximum storage time	Protect from	Indicators Good      Perished	Comments
Ergometrine injection	up to 15° (in fridge)	Expiry date	heat light air		stable for 1 year at <25°
Ferrous sulfate and folic acid tablets	up to 25°	"	heat light	discoloration change in consistency	very stable
Isoniazid	up to 35°	"			very stable
Iodine solution		"			stable
Lidocaine hydrochloride injection		"	moisture light		
Metronidazole tablets		"			
Niridazole		"	air moisture	dark brown, will not dissolve	
ORS packets	below 25°C if possible above 8°C	"	air light		elixir should <i>not</i> be refrigerated
Paracetamol (Acetaminophen) elixir		"	air moisture		very stable
Phenobarbital tablets		"	air moisture		stable
Piperazine elixir		"	air moisture light		
Phenoxymethyl penicillin tablets	up to 30°C	"	moisture		
Procaine	up to 30°C	"	heat		very stable
Retinol (Vitamin E) capsules	up to 15°C (refrigerator)	"	air moisture light		
Senna tablets		"	moisture light		




Storage recommendations and stability characteristics of 33 selected drugs from the WHO model list of essential drugs

Essential drugs	Storage temperature	Maximum storage time	Protect from	Indicators		Comments
				Good	Perished	
Sulfacetamide (ophthalmic) ointment	15 to 18°C	to 2 years if unopened 10 days if open	air moisture light			
Sulfamethoxazole trimethoprim tablets		"	air light moisture			
Tetracycline tablets		1 year	air light moisture		brown when broken	expired tablets may be toxic
Thiabendazole tablets Water for injection					Cloudiness	

# Annex II

## How to use a cold chain monitor

This annex shows you a new type of monitor which is now in use. The card is normally yellow with white monitor marks that turn blue as described below.

 <b>VACCINE COLD CHAIN MONITOR</b> <b>CONTROLE DE LA CHAINE DE FROID</b> <b>CONTROL DE LA CADENA DE FRIO</b> <b>مراقب سلسلة تبريد اللقاح</b>				
ARRIVE/ARRIVEE/RECIBO/وصول		LOCATION	DEPART/DESPACHO/مغادرة	
DATE IN DATE D'ENTREE FECHA DE RECIBO تاريخ الدخول	INDEX INDICE دليل	LIEU LUGAR اسم المكان	DATE OUT DATE DE SORTIE FECHA DE SALIDA تاريخ الخروج	INDEX INDICE دليل
	10N 38N			10N 38N

\*If windows remain all white, INDEX = 0     
 \*Si tous les voyants restent blancs, l'INDICE = 0     
 \*Si todas las mirillas permanecen blancas, INDICE = 0     
 \*إذا بقيت النوافذ بيضاء كلها، عندئذ الدليل = صفر

To Activate Fold Up & Pull	<b>3M</b> <b>Monitor Mark</b> U. S. Patent No. 3,954,011	INDEX/INDICE/دليل 0 1 2 3 4 5	10N
	<b>3M</b> <b>Monitor Mark</b> U. S. Patent No. 3,954,011	INDEX/INDICE/دليل 0 1 2 3 4 5	38N

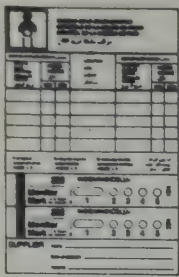
**SUPPLIER** Name: \_\_\_\_\_  
 Date of dispatch: \_\_\_\_\_  
 Vaccine: \_\_\_\_\_

*Reproduced courtesy of WHO/EPI*

The two strips with dots on the card are heat sensitive. The top one begins to turn blue as soon as the temperature is above 10°C. The bottom one starts to turn blue when the temperature is over 38°C. If the temperature falls below 10°C or 38°C the colour change stops.

Therefore it is possible to know how long vaccine has been subjected to high temperatures. The following diagram tells you what action you should take for any colour combination you can have.





**Check your  
cold chain  
monitor!**

**Vérifiez votre  
indicateur de  
contrôle de la  
chaîne du froid!**

**¡Examine el  
monitor de su  
cadena de frío!**

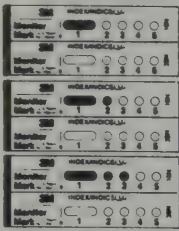
**إفحص مراقب  
سلسلة التبريد  
لديك!**

◀ Cold chain good — use all vaccines

◀ Bonne chaîne du froid — tous les vaccins peuvent être utilisés

◀ La cadena de frío está bien — utilice todas las vacunas

◀ سلسلة التبريد جيدة: يمكن استعمال جميع اللقاحات

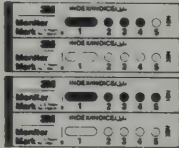


**CHECK** for cold chain failure.  
**USE** Oral Polio vaccine within 3 months.

**VÉRIFIEZ** s'il y a eu déficience de la chaîne du froid.  
**UTILISEZ** le vaccin antipolio oral dans les trois mois.

**VEA** si ha habido fallo en la cadena de frío.  
**UTILICE** la vacuna antipoliomielítica oral antes de 3 meses.

أحدث عن أي حدث في سلسلة التبريد .  
استعمل لقاح شلل الأطفال عن طريق الفم خلال 3 شهور .



**URGENT**  
**CHECK** for cold chain failure.  
**USE** Measles vaccine within 3 months.  
**TEST** Oral Polio vaccine before use.

**URGENT**  
**VÉRIFIEZ** s'il y a eu déficience de la chaîne du froid.  
**UTILISEZ** le vaccin antirougeoleux dans les trois mois.  
**VÉRIFIEZ** le vaccin antipolio oral avant de l'utiliser.

**URGENTE**  
**VEA** si ha habido fallo en la cadena de frío.  
**UTILICE** la vacuna contra el sarampión antes de 3 meses.  
**COMPRUEBE** la vacuna antipoliomielítica oral antes de utilizarla.

عاجل . أحدث عن أي حدث في سلسلة التبريد .  
استعمل لقاح الحصبة خلال 3 شهور .  
أختبر لقاح شلل الأطفال عن طريق الفم قبل الاستعمال .

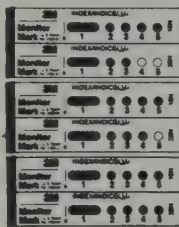


**URGENT**  
**FIND** an alternative storage facility and investigate cold chain failure.  
**USE** DPT and BCG vaccine within 3 months.  
**TEST** Measles and Oral Polio vaccine before use.

**URGENT**  
**TROUVEZ** une autre installation pour l'entreposage et faites une enquête sur la déficience de la chaîne du froid.  
**UTILISEZ** le vaccin DTC et le vaccin BCG dans les trois mois.  
**VÉRIFIEZ** le vaccin antirougeoleux et le vaccin antipolio oral avant de les utiliser.

**URGENTE**  
**ENCUENTRE** otro medio de almacenamiento e investigue el fallo de la cadena de frío.  
**UTILICE** la DPT y la BCG antes de 3 meses.  
**COMPRUEBE** la vacuna contra el sarampión y la vacuna antipoliomielítica oral antes de utilizarlas.

عاجل . أحدث عن مرفق تخزين بديل وتجرى أسباب التحسن في سلسلة التبريد .  
استعمل لقاح الثلاثي (دفتريا - سعال ديكلي - تيتانوس) ولقاح الـ بي سي جي خلال 3 شهور .  
أختبر لقاح الحصبة ولقاح شلل الأطفال عن طريق الفم قبل الاستعمال .



**URGENT**  
**FIND** an alternative storage facility and investigate cold chain failure.  
**TEST** Measles, Oral Polio, DPT and BCG vaccine before use.

**URGENT**  
**TROUVEZ** une autre installation pour l'entreposage et faites une enquête sur la déficience de la chaîne du froid.  
**VÉRIFIEZ** le vaccin antipolio oral, le vaccin antirougeoleux, le vaccin DTC et le vaccin BCG avant de les utiliser.

**URGENTE**  
**ENCUENTRE** otro medio de almacenamiento e investigue el fallo de la cadena de frío.  
**COMPRUEBE** las vacunas contra el sarampión, antipoliomielítica oral, BCG y DPT antes de utilizarlas.

عاجل . أحدث عن مرفق تخزين بديل وتجرى أسباب التحسن في سلسلة التبريد .  
أختبر لقاح الحصبة ولقاح شلل الأطفال ولقاح الـ بي سي جي واللقاح الثلاثي (دفتريا - سعال ديكلي - تيتانوس) قبل الاستعمال .

Thus for example, if the top card shows blue in 1, 2 or 3, you may use all vaccines. Make sure OPV is used within three months (a health centre normally only holds it for 1 month).

The numbered windows are NOT temperatures, they only indicate the progress of colour change.

At the top of the card you see the complete card. At each stage of the cold chain, check this card. Record the reading on the strips. It is then possible to see if there has been a break in your cold chain. It also shows you where the break has happened. This helps you to find out what has gone wrong.

If you receive a supply of vaccine which included one of these monitors, this is what you should do:

1. Check the index and mark the last number which is blue in the index column on the card. If there is no blue at all mark 0. Also write in the date and the name of the supplying store.
2. Keep this monitor with the vaccine which it came with.
3. When you send out a supply of this vaccine you can include the monitor with it. Before it leaves your refrigerator again, mark the last number which is blue with the date and your name.
4. Make sure that someone at the store you send the vaccine to knows how to use the monitor.

# Annex III

## How to recognize frozen DPT, DT and TT vaccines

### HAS YOUR DPT OR TT VACCINE BEEN FROZEN?

To check if adsorbed DPT or TT vaccine has been frozen\* and thawed shake the vial vigorously and place it in front of a light. Do the same with a vaccine which is thought not to have been frozen.

### VOTRE VACCIN DT COQ OU ANTI-TÉTANIQUE A-T-IL ÉTÉ CONGELÉ?

Pour vérifier si des vaccins adsorbés DTCoq et antitétanique ont été congelés\* et dégelés, agiter énergiquement le flacon et le regarder devant une source lumineuse. Procéder de même avec un vaccin qui n'a pas été congelé.

### ¿HAN ESTADO CONGELADAS LA VACUNA DPT O LA ANATOXINA TETANICA?

Para verificar si la vacuna DPT o la anatoxina tetánica adsorbidas han estado congeladas\* y descongeladas, agítense el frasco enérgicamente y colóquese ante una luz. Hágase lo mismo con una vacuna que no haya sido congelada.



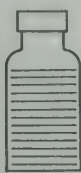
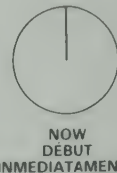

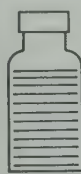
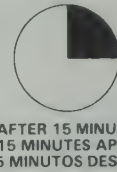


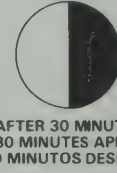

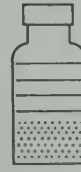
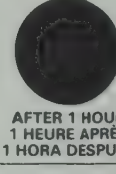

EXPANDED  
PROGRAMME ON  
IMMUNIZATION

PROGRAMME  
ELARGI DE  
VACCINATION

PROGRAMA  
AMPLIADO DE  
IMUNIZACION

VACCINE NEVER FROZEN  
VACCIN QUI N'A JAMAIS ÉTÉ CONGELÉ  
VACUNA QUE NO HA ESTADO CONGELADA

VACCINE FROZEN AND THAWED  
VACCIN CONGELÉ, PUIS DÉGELÉ  
VACUNA CONGELADA Y DESCONGELADA

Smooth and cloudy. Lisse et trouble. Lisa y turbia.				Contains floccules or granular particles; appears less cloudy. Contient des flocons ou particules granulaires; paraît moins trouble. Contiene flóculos o gránulos; parece menos turbia.
Still smooth and cloudy. Est encore lisse et trouble. Sigue lisa y turbia.				Has a sediment settling on the bottom of the vial. Un dépôt apparaît au fond du flacon. Tiene un sedimento en el fondo del frasco.
Has begun to clear but has no sediment. Commence à se clarifier, mais sans former de dépôt. Empieza a aclararse pero no tiene sedimento.				Almost completely clear with a dense sediment. Est devenu presque complètement clair; le dépôt est dense. Casi completamente clara, con un sedimento denso.
Half clear with a thick cloudy sediment which moves when the vial is tilted. A moitié clair; il y a un sédiment épais et trouble qui bouge si le flacon est incliné. Medio clara con un sedimento turbio espeso que se mueve cuando se inclina el frasco.				Completely settled; sediment hardly moves when the vial is tilted. Le dépôt a fini de se constituer; il ne bouge guère quand le flacon est incliné. Completamente sedimentada; el sedimento apenas se mueve cuando se inclina el frasco.

\*Adsorbed DPT and TT vaccines freeze at temperatures below -4°C.

\*Le DTCoq et l'anatoxine tétanique adsorbés gèlent au dessous de -4°C.

\*La vacuna DPT (difteria, tos ferina y tétanos) y la anatoxina adsorbidas se congelan a temperaturas inferiores a -4°C.



USE THIS VACCINE  
UTILISEZ CE VACCIN  
USE ESTA VACUNA



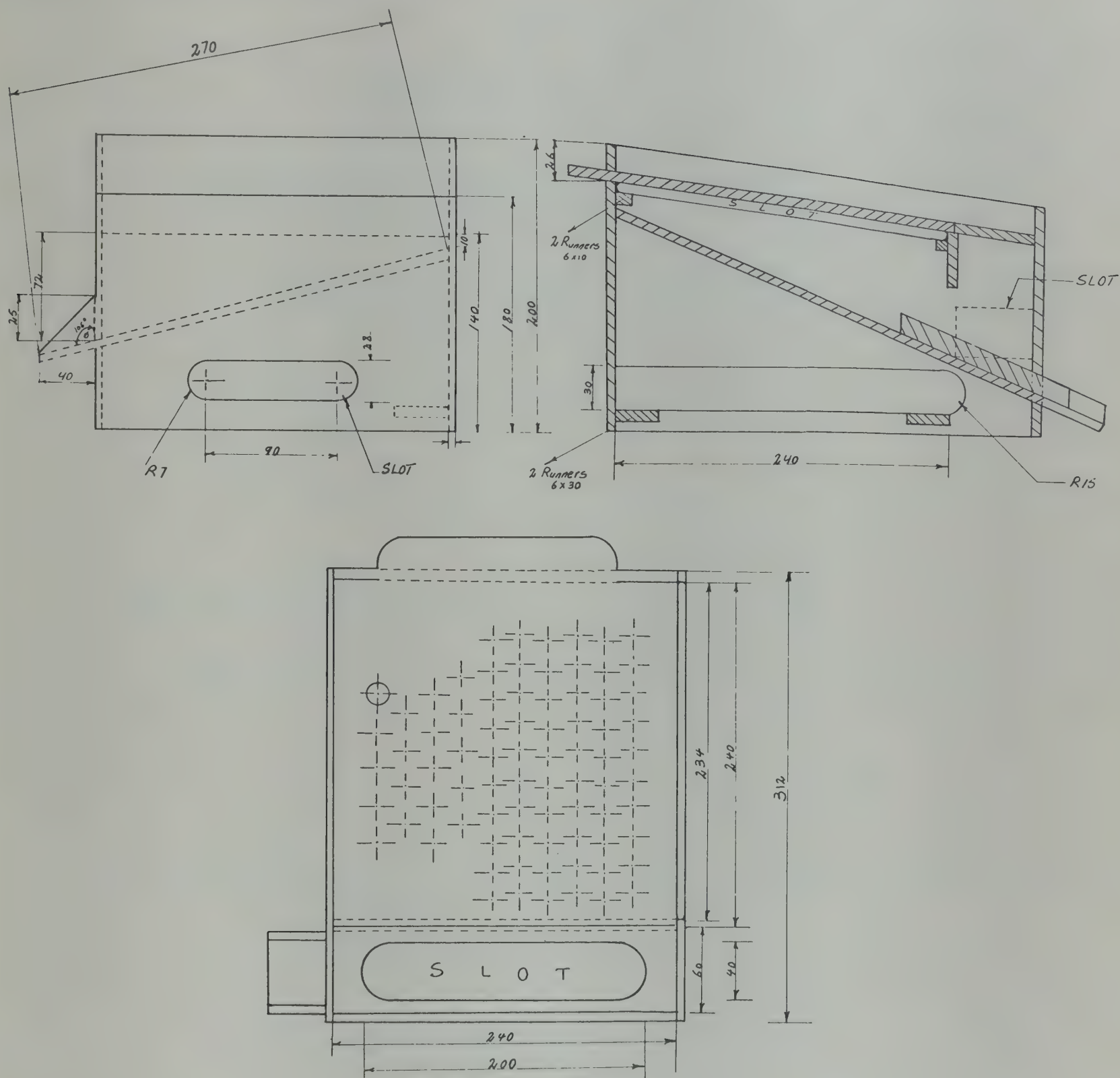
DO NOT USE THIS VACCINE  
N'UTILISEZ PAS CE VACCIN  
NO USE ESTA VACUNA

Reproduced courtesy of WHO/EPI



# Annex IV

## Detailed working drawing for tablet counter



Reproduced courtesy of Paul Schofield and Oxford Polytechnic

# Annex V

## Further reading list

- Community Health 1981  
Wood C.H. et al (eds.)  
478 pp  
African Medical and Research Foundation,  
PO Box 30125, Nairobi, Kenya
- Design for Medical Buildings: A Manual for the Planning and Building of  
Health Care Facilities under Conditions of Limited Resources 1975  
Mein Philip and Jorgensen Thomas  
146 pp  
University Housing Research and Development Unit,  
University of Nairobi, PO Box 30197, Nairobi, Kenya  
(in association with AMREF, Nairobi)
- A guide to estimating capacity of equipment for storing and  
transporting EPI Vaccines  
Ref EPI/CCIS/80.10  
WHO
- How to look after a refrigerator 1980  
Elford Jonathan  
58 pp  
Appropriate Health Resources & Technologies Action Group Ltd.,  
85 Marylebone High Street, London, W1M 3DE
- Logistics and Cold Chain. A workshop for EPI Trainers, WHO  
127 pp  
World Health Organization
- Managing Drug Supply 1982  
Management Sciences for Health, Boston  
592 pp  
Management Sciences for Health (in association with USAID and WHO),  
210 Lincoln Street, Boston, Massachusetts 02111, USA
- A Manual of Building Construction (rev. ed.) 1975  
Dancy H. K.  
362 pp  
Intermediate Technology Publications Ltd.,  
9 King Street, London, WC2E 8HN
- A Model Health Centre 1975  
Report by Working Party, Medical Committee, Conference of Missionary  
Societies in GB and Ireland  
16 pp and 52 appendices  
Chairman, CMS in GB and I.,  
Edinburgh House, 2 Eaton Gate, London, SW1W 9BL
- On Being in Charge. A Guide for Middle-Level Management in Primary  
Health Care (Part III: 'Managing Resources') 1980  
McMahon Rosemary et al  
366 pp  
World Health Organization



- **Primary Child Care: Book One. A Manual for Health Workers** (Chapter 3: 'Supplies and Equipment') 1978  
King Maurice et al  
315 pp  
Oxford University Press  
Walton Street, Oxford, OX2 6DP
- **Product information sheets**  
SUPDIR AMT 4, UNICEF
- **Technicians' hand books** 1981  
in six parts and catalogue of manufacturers spare parts.  
EPI/WHO Geneva 1981
- **Users' hand books for compression refrigerators, kerosene and electric absorption refrigerators, gas and electric absorption refrigerators**  
EPI/WHO Geneva 1981

**Materials available from WHO/EPI, Geneva:**

**Thermometer/Indicators:**

Freeze watch	Indicator for showing if the temperature has been below 0°C in the refrigerator.
Thermometer	Vaccine storage 4°/8°C. Vaccine storage -20°C.
Indicators	Time/Temperature tags: +10°C and +38°C, show when the temperature has been above these temperatures and by how long.

**Posters:**

- "Looking after Vaccines" — a set of 3
- "This Refrigerator Protects Lives, How to Pack a Fridge with Vaccines"
- "Vaccine Rush" — transportation sticker
- "Stop, do you need to open it?"
- "Looking after Equipment" — fold-out
- "Looking after Vaccines" — fold-out
- "Has your DPT been frozen?"

Details of WHO publications can be obtained from:

Publications Unit, WHO, 1211 Geneva 27 Switzerland.

The Unit also supplies a list of booksellers around the world who sell WHO publications.

# Annex VI

## Temperature record

MONTHLY CHECK		Evaporator free of ice		Water bottles in refrigerator		Door closing correctly		Door seal in good condition and clean		Rust free		Condenser clean		Refrigerator lining uncracked		Thermostat working	
		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	

Month	August	1982	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM













## **The Appropriate Health Resources and Technologies Action Group Ltd.**

AHRTAG is concerned with the development of equipment and techniques for health care at community level. It also provides an information service on appropriate technology for health.

Special areas of interest include:

- the cold chain
- dental health
- disability prevention and rehabilitation
- diarrhoeal diseases

Since it began in 1977, AHRTAG has been in touch with overseas groups with similar interests and is part of an informal world network linking people interested in primary health care.

### **Publications:**

- 'How to look after a refrigerator'  
by Jonathan Elford, gives step-by-step instructions for the care and maintenance of kerosene, gas and electric refrigerators. Also available in Spanish and Turkish, 58 pp (1980)
- 'Low cost aids'  
by Don Caston & Joan Thompson, shows a wide range of aids for disabled children, 53 pp (1982)
- 'Low cost physiotherapy aids'  
by Don Caston & Joan Thompson, 45 pp (1982)
- 'Primary health care in developing countries: a guide to resources in the U.K.'  
32 pp (1982)

### **Free publications:**

- 'Diarrhoea Dialogue' – a quarterly newsletter on all aspects of diarrhoeal disease control. Also available in French and Spanish.
- 'How to make hand grips' – a poster showing ways in which clay, plaster and epoxy resin putty can be used to make hand grips to allow disabled people to hold tools, spoons and brushes, etc. (1981).
- 'The AHRTAG baby length measurer' – free working drawings for a simple, lightweight, baby length measurer which can be made from wood and taken apart for easy carrying (1982)
- 'How to make an illuminator' – a free leaflet of a simple design for an illuminator which can be used with an oil or candle lamp, battery power, mains electricity or even sunlight (1982)
- Dental health newsletter – bi-annual newsletter promoting dental health care

For details of prices and postage write to TALC, PO Box 49, St. Albans, Herts AL1 4AX, United Kingdom.